

Developing Academics' Pedagogical Acuity

**Proceedings of
1st International Conference
on Higher Education Pedagogy
&
Faculty Development**
*University of Crete,
Rethymnon*



ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
UNIVERSITY OF CRETE

Edited by
**Dr. Kallia Katsampoxaki-
Hodgetts**

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Dr. Kallia Katsampoxaki Hodgetts

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Editor's Preface

A notable strength of the Academic Development field is its commitment to academics' empowerment toward more learning-centred and inclusive teaching learning practices. Working towards constructive synergies and collaborations, we can overcome the challenges faced by all stakeholders in Higher Education and by prioritising reflection through participatory academic development contexts our communities (communities of practice, discourse communities and communities of learning) will grow past inequalities and thrive.

In line with this, the first international conference on Higher education pedagogy and Faculty Development at the University of Crete Teaching and Learning Center was held in Rethymnon, Greece on 15-17 September, 2023. It featured 80 presentations from 22 International Universities and 13 different countries. This volume includes 22 selected papers which draw on practical and theoretical explorations of Academic Development in local contexts.

This book is divided in five sections so as to showcase a variety of academic development approaches and perspectives. Section one provides a snapshot of debates appearing in the field regarding academic development processes

like peer observation, micro teaching and reflective and participatory communities of learning and practice through MOOCs. Section two continues to give us a concise account of active learning approaches that involve student engagement strategies and enhance student agency. Section three focuses on student perspectives and attitudes following student-centred interventions. Section four focuses on academics' views and attitudes, and shares useful insights regarding academics' needs in terms of student-centred and inclusive practices. Section five sheds light on digital innovations and virtual technologies fostering learning centred approaches in typical and atypical learning contexts.

Issues visited at the conference were not limited to the ones presented herein, but they are indicative of academics' vision and endeavours towards improving higher education learning environments and increasing opportunities for student success.

Dr. Katsampoxaki-Hodgetts (Editor)

Section A

**Academic development
approaches and policies**



1. Utilizing the theory of Constructionism in Teacher Education: the relationship between Constructionism & Micro-teaching

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Abstract. The rapid changes that affect every social sector, and education in particular, leads to the need for evolution of the educational system as well as of teachers.

In this context, the training of teachers as well as their re-education continues to concern the scientific community as a topical issue (Chatzopoulou, 2014). At the same time, the nature of learning and the ways in

which it can be achieved for those involved in learning or social interaction processes, is a topic that continues to occupy educational research (Danilewicz et al., 2019). Based on the above, this paper very briefly presents the theory of Papert's Constructionism, focuses mainly on the social aspect of Constructionism and briefly presents the results of this approach, in the learning process. Subsequently, the relevance of this theory to learning environments, and more specifically to Micro-teaching, which is applied in university departments of Teacher Education, is presented. The research was carried out by means of a literature review, while specific criteria for literature investigation were used and a specific process of searching mainly international sources was employed. Finally, a conclusion is drawn on how the practice of microteaching can be used to approach the learning of teacher candidates in the light of Constructionism.

Keywords: *constructionism; micro-teaching, teacher education; higher education*

1. Introduction

The rapid changes that affect every social sector, and education in particular, leads to the need for the evolution of the educational system and teachers. In this context, the education of teachers as well as their re-education continues to concern the scientific community as a topical issue (Chatzopoulou, 2014).

At the same time, the perception of the nature of learning and personal and social development is at the center of scientific research. In particular, assumptions related to the origin of knowledge, its constitution, the purposes it serves and its acquisition have a decisive influence on the intentions and choices of those involved in processes of learning or social interaction (Alanzi, 2016).

2. Methodology of Literature Review

In this study, a scoping review was applied because it was considered the most appropriate review method to approach the topic. As Arskey and O'Malley (2005), who have worked extensively with scoping reviews have pointed out, such a literature method can be applied to identify a scope of the topic to be studied, to clarify key terms in the literature, to identify gaps in the literature and even, as a precursor to a systematic review. This paper, respectively, aims to highlight the field in which we encounter constructivist or constructionist practices, to show the difference between the two concepts constructivism and constructionism and to see the research gap in relation to the topic. Particularly, the concepts of constructivism and constructionism are briefly defined below, and it was found from the scoping review that specially the constructionism approach, appears in areas related to science education and learning or computer science and computational thinking. In contrast, we found that constructionist practices are absent from the literature in other teaching fields. Therefore, we wanted to demonstrate the relationship between constructionist practices and the microteaching technique, since through the clarification of the concept, we found many common elements. Thus, our search strategy included keyword searches in the literature and on the internet. Such were constructivism vs constructionism, adult education, scope, constructionism and microteaching. The search also included tracking citations in databases such as Scopus, Google Scholar, Academic Library Associations, ERIC, Science Direct-Elsevier, Conference Proceedings Citation Index- Social Science & Humanities, Oxford Journals and the online platform of Taylor & Francis Online publications. We should also say that our searches were limited to peer-reviewed journal articles, conference proceedings and doctoral dissertations published after 1990 to the present, in order to get a contemporary "look" on the topic, since the concept of constructionism is, after all, quite contemporary in education. There was no restriction on the place of publication, as long as the language was in Greek, English or Italian, so that the researcher could study the texts through familiar languages. After the search, we separated the studies that referred to the definition of concepts and those that highlighted the fields of application. The scoping review results are shown below.

3 Constructionism vs Constructivism

An attempt, therefore, to achieve interaction between the learner and his environment and to enhance the learner's involvement in the learning process was also made by Piaget's student Seymour Papert (1928-2016), who, criticizing the Constructivist approach, developed the theory of Constructionism. According to the latter, students should create physical objects to practice what they have learned and experience the results tangibly, while engaging in the production of the construction of knowledge, so that this approach can be considered as learning through construction (Papert and Harel, 1991). Knowledge is constructed where complex problems and real issues arise in learning environments and, in particular, where learners are engaged and involved. For Papert,

knowledge is an essential foundational element in the context of learning and is shaped by product design. Thus, the more learners design, think and rethink creations, the more they learn and sharpen their thinking and enhance their knowledge, which is a developmental process in Papert's view (Ackermann, 2001). That is, within constructionism, the learning that develops in students' thinking is placed in the context of creating products and not exclusively in the learning process itself, thus suggesting that learning should take place in a physical and tangible way, not just cognitively, as constructionists believe (Ackermann, 2001). Papert's approach to learning, according to researchers such as Ackermann, (2001), helps us to understand how ideas are formed as a result of cognitive learning.

Also, Papert attributed the difficulty in understanding basic concepts to the inadequacy of education to utilize materials that would make an idea or concept simple and concrete (Parmaxi and Zaphiris, 2014). However, constructionism offers a fertile ground for promoting the concreteness of knowledge since "when we construct objects in the world, we engage with them and the knowledge required to construct them, so it is very likely that we will make that knowledge concrete (Wilensky, 1991).

This positioning makes learners as active constructors of their own knowledge as they engage in making objects using a range of materials. These artefacts become the 'objects with which they think' (Papert, 1980, p. 12) and support the development of specific ways of thinking and learning about concepts and practices (Brennan and Resnick, 2012). Thus, engaging with them cultivates the ability to manipulate these objects, make continuous adjustments and improvements, or experiment (Butler and Leahy, 2021).

From the above assumptions, it can be understood that constructionist (constructionism) learning environments are those environments that facilitate activities involving the construction of new knowledge. Bers et al. (2002) have referred to four key principles that underlie the spirit of constructionism: "(a) learning through designing projects that are shared with the community, (b) using concrete objects to construct and explore the world, (c) identifying powerful ideas that are both individually and epistemologically significant, and (d) the importance of self-reflection as part of the learning process" (p. 123) (Clinton and Rieber, 2010).

In summary, constructivism is based on the idea that learning takes place when objects are designed, so that knowledge is not only built upon prior knowledge in the minds of students, but also exists tangibly as evidence of learning (Alanazi, 2016).

3.1. Social Constructionism

This pedagogical innovation promotes the autonomy of the student and the redefinition of the role of the teacher, with all the consequences of this positioning of the student from the periphery to the centre of the processes of action and construction. As we can see, constructivism places great emphasis on objects apart from their maker, which can be presented, discussed, examined, tested and admired. Thus, sharing a creation can result not only in its refinement, but also in gaining a deeper understanding of other perspectives (Fino, 2017). In particular, constructionism holds that meanings are produced anyway to some extent outside the control of an educator or the sequencing of an activity. Therefore, when designing educational activities, instructional intervention can only aim to create an environment rich in opportunities and challenges for the production of any meaning. (Kynigos, 2015).

Such an environment requires opportunities for collaboration and social interaction, concepts to which the dimension of Social Constructionism refers. In later articles, Papert Emphasises that

knowledge is best constructed in a social context in which participants create something that can be shared. This view is consistent with the theories of Vygotsky, Lave, Wenger and others (Papert, 1999) in (Cannings, Stager, 2003) and adds a social dimension to Constructionism.

Social Constructionism is an important model of social analysis, which emerged from the 1970s onwards as an alternative way of thinking about the social world with the dominant concept of social construction (Mavridis, 2015). It is a broader theoretical orientation, which offers an alternative perspective on social research and feeds various contemporary alternative approaches to the study of socio-psychological phenomena (Alvesson and Skoldberg, 2009; Burr, 2003).

A key assumption of Social Constructionism is the dynamic interaction between knowledge and social action. Knowledge about the world is the result of human interaction and a set of intersubjectively shared meanings, relations and practices and is constructed and reconstructed through social interaction (Mavridis, 2015). A set of ideas, meanings, values and practices constitute the knowledge that is embodied in our personal identity, while at the same time feeding and being fed by our social action (Burr, 2003).

Thus, in an informal social environment what we call "social consistency, a sense of belonging to a group and a sense of common purpose" is created. Similarly, in an educational environment such as a school, constructionists focus on how the social context enhances the building of connections with what is learned. Papert has highlighted the critical role of the cultural context in building internal cognitive structures by pointing out that surrounding cultures can inform and facilitate Piagetian constructivist (constructivism) learning (Parmaxi and Zaphiris, 2014).

Finally, another view stemming from Social Constructionism is *Distributed Constructionism*, according to which learning is not an exclusive goal, but is mediated by resources present within the learning environment. Thus, knowledge is distributed through the tools/resources that exist in the environment and are the means by which students access and understand the environment. Therefore, learning is a cycle of cognitive development that occurs as a result of relationships between individuals and other knowledge networks (Rogers, 2006). It was based on the idea that learning should be viewed "not as a property of an individual, but as a process of interaction with others and the environment" (Burr, 2015).

From the literature review, it is evident that the constructionist approach is very often found in digital technology and computational thinking environments. Neofytidis and Ioannou point out in their article that Papert was the first to try to integrate programming into the classroom by creating the Logo programming language so that children of all ages could learn to program. Also, Papert was the first to use the term Computational Thinking (CF) and showed the importance of the ability to think computationally (Neofytidis and Ioannou, 2018).

However, we can also identify relevance with other educational environments and in particular with that of Teacher Education. In particular, an attempt will be made to relate Micro – teaching practices, as a technique of Teacher Education, to the Constructionist learning perspective.

3.2 Relationship between Social Constructionism and Microteaching applied in undergraduate studies by teacher candidates.

The practice of microteaching is a teaching technique applied in many academic institutions around the world preparing teacher candidates to become familiar with real classroom dynamics (Fernandez, 2010; Msimanga, 2020; Danday, 2021).

Allen and Ryan define microteaching as an instructional practice that provides a teaching environment that familiarizes teacher trainees with situations encountered in a regular classroom. Through this process the teacher candidate receives extensive feedback (Allen, and Ryan, 1969). More specifically, microteaching is a 5 to 30-minute laboratory exercise, depending on the model followed at the time, in which the teacher candidate teaches a limited teaching unit to a small audience of fellow teacher trainees in order to familiarize them with specific teaching skills and to acquire pedagogical approaches. A key element of the micro-teaching is its video recording, so that, in addition to the trainees, the teacher is able to observe him/herself on video as a teacher immediately after the teaching has taken place or later and reflect on it. The viewing is followed by comments and judgments from the trainees and the supervising educator (Hatzidimou, 1997; Kouyiourouki, 2003; Giannakopoulou, 2008).

As already mentioned, constructionism is particularly applicable to learning through digital technology, since Papert, himself, argued that "if you can use technology to make things, you can make very interesting creations and learn a lot more by making them", (Papert, 1999) in (Cannings and Stager, 2003). If we take into account that in the practical exercises of the Micro-teaching exercises, teacher trainees are encouraged both in innovative uses of technology and in creating interactive learning environments, we find elements of the above theory in these teaching exercises.

Also, Microteaching can be strongly associated with the social aspect of Constructionism. We have seen that Constructionism focuses on the social nature of learning, noting that activities such as making, building, or programming, through which the pre-service teachers produce objects that others can see and judge, provide a rich learning environment. Artifacts are a means by which others can engage in the thinking process while the student's thinking benefits from multiple perspectives and discussions (Butler, 2007). Similarly, in micro-teaching, through the feedback and re-assessment that takes place, each student's thinking is expanded, enriched by peer ideas and supervisor suggestions on the unit taught and a teaching scenario is 'produced' which promotes meaningful criticism and discussion. This was confirmed by research by (Crichton et al., 2021) who, studying the outcomes of microteaching for teacher trainees under the lens of social constructionism, found that there were significant benefits for students who learned in group work, or solved problems collaboratively and - in the context of microteaching - received feedback from their peers (Crichton et al., 2021).

At the same time, according to Social Constructionism, through feedback or group discussions, learners are encouraged both to articulate their thinking and to understand and integrate the views of others. In this way, artefacts or 'objects for thought' provide a link between sensory and abstract knowledge and between the individual and the social world. Furthermore, shared knowledge is constructed when artefacts and shared understanding, linked through cycles of representation and interpretation using a gradual spiral approach, by engaging in discussions around their own artefact or someone else's artefact in each cycle, developing a shared understanding (Butler and Leahy, 2021). This process is also found in Microteaching, where students collaborate, exchanging views on both their own teaching and that of their peers, ultimately developing a shared understanding of each teaching method used. This collaboration with others reinforces the Connectionist nature of group planning discussions (Crichton et al., 2021).

Subsequently, the Social Constructionist approach is concerned with social-cognition, i.e. enhancing learners' awareness of group learning processes through which basic skills are cultivated that are recognised as essential to any shared learning process. Learners should acquire collaborative work skills such as organizing, discussing, seeking and offering help from peers when needed (Kynigos, 2015). Similarly, in micro-learning, group work is highly utilized, organization, searching for

appropriate resources and information for each "micro-learning" is required, and the development of critical thinking, motivation, collaboration and communication skills among participants is highlighted (Stigmar, 2016).

Constructionism shows that learning can be more effective when something is created for others (Kazlauskiene, 2022). More specifically, this applies to microteaching, since the organization and implementation of a microteaching to be presented to fellow students gives opportunity and more effective learning of this process (Kazlauskiene, 2022). In this way, they "build" the knowledge of all the relevant theories taught in the theoretical courses.

Nugrahenny T. Zacharias (2016) also reports, in a research conducted under the light of Social Constructionism, that students at an Indonesian university, for their micro-teaching requirements, compose and create their own materials to familiarize students with their subject matter. However, the fact that none of the student-teachers use "ready-made" teaching materials, but are willing to spend considerable time and energy to create teaching materials appropriate to each situation, probably also suggests the extent to which they actively construct their identities as material creators (Zacharias, 2016).

4. Conclusions

In summary, we could argue that according to Papert's Constructionism, creating and working with objects, artefacts and tools of all kinds engages learners in the development of the learning process and in continuous learning activities (Cooke and Beckett, 2016). All this is relevant to teacher education and can also be approached within the context of microteaching.

Additionally, *Social Constructionism* argues that learning is very effective when we build something for others to experience. On this aspect, in the context of a *Microteaching*, the way of "building" and implementing a micro-learning in a group of students, creates a social environment of knowledge. Therefore, teaching and learning are seen as a process of knowledge construction that evolves into social interaction. So, when participants in the micro-teaching are invited to take on the role of the teacher, through the social interactions proposed by social constructionism, the members of a class become a collective "we" and co-create opportunities for learning and shared understandings (Skukauskaitė and Girdzijauskienė, 2021).

On the other hand, *Social Constructionism* notes a potential for continuous learning, revisions of previous concepts and development of new ways of thinking, knowing, growing and being in and through social interactions. This is very important for academic teachers who are essentially required to invite students to participate to co-create, co-negotiate and adapt the learning environment based on collective needs and demands, which can take place after the implementation of the Micro-teaching. The dimension is important and must be taken into account in the context of University Pedagogy creating room for adaptations when student-teachers are "tested" through their Micro-teaching and reflect on their own reality and their own contribution to the construction of knowledge.

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2. Low Stress Peer Observation Protocols to Enhance Instructor Awareness and Capabilities

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Abstract. This case study on peer observation protocols focuses on the American University of Armenia's three phased professional development peer observation certification program (based on previous research by Hargis [2014]). The program is designed to minimize stress while also

enhance instructor awareness and capabilities in

teaching. Instructors voluntarily went through an instructional class on the program's protocols to be "certified" to sit in another peer's class, effectively observe the class instructional session, and were then able to provide a structured but low stress discussion on what they perceived and felt during their peer observation session. The protocols for this program have three distinct sections: 1. Initial Meeting, 2. Observation, and 3. Post Meeting with Two-Way Discussion. Additionally, the protocols involve three components within the Observation section: 1. Quantitative Checklist (Noben et al., 2021), 2. Faculty Class Flow Diagram (Cheong Yin Mei et al., 2017; Fernandes et al., 2011; Gunter et al., 1995), and 3. Qualitative Field Narrative (Chism and Banta, 2007). Key aspects such as interactions, terminology, and processes are specifically highlighted as opportunities to ensure low stress engagement to maximize acceptance of observations made and reflection on the process, along with a shared vision of how to change or improve instructional capabilities moving forward. Additional aspects such as self-evaluation and artificial intelligence (AI) integration are also discussed.

Research Contribution: Provides key insights into the creation and use of low stress peer observation protocols to enhance instructor awareness and capabilities. Specific procedural steps and tools used are presented to assist others in using this technique.

Keywords: *peer observation, instructor awareness, evaluation, teaching development*

1. Introduction

This practical case study presents evidence-based protocols specifically designed to create a low stress peer observation process to assist instructors in gaining a better awareness of their teaching capabilities. Stress has been identified in many studies as negatively affecting instructors' health and performance (Agyapong et al., 2022; Johnson et al., 2005). With this in mind, particular attention was placed on reducing the stress involved in having a peer observe one's classroom instruction in the development of these protocols. Conducting peer observations has been shown to be an important part of overall instructional development (Crawford, 2022; Kohut et al., 2007), so every effort needs to be made to help ensure that it is implemented properly.

2. Method

To help ensure that faculty participants would be able to properly go through a peer observation process (as an observer) and follow all protocols, a special "certification" course was created and administered. The class consisted of not only going over the tools used for the observation (Quantitative Checklist, a Faculty Class Flow Diagram, and a Qualitative Field Narrative), but a demonstration of a mock observation process was presented along with a discussion where participants had to answer questions about why certain processes were to be followed. Key protocols regarding how the overall process, consisting of an Initial Meeting, the Observation, and a Post Meeting, conducted in a low stress manner, were highlighted throughout the certification process.

Participants were told to specifically avoid negative comments such as "You lectured the whole time so the students thought you were boring and didn't pay attention." Instead, participants were told to use a more positive tone and explanation such as "Although you were able to provide a lot of useful information, student engagement and attention could have been increased by asking students more questions and incorporating more active learning."

The nursing school at the university where this action research (case study) was conducted asked to participate in a peer observation in order to improve their overall teaching and enhance students' experience. This is why, they asked for a peer lecturer from the Center for Teaching and Learning to go through the peer observation process.

The first protocol of the low stress peer observation process was the Initial Meeting between the observer(s) and the observee (in this case with a nursing school professor). The Initial Meeting set the foundation for fostering a successful collaborative learning environment between the two parties. During the initial meeting those involved got to know each other, establish the goals and objectives of the observation itself, built rapport between each other, set expectations, discussed, and got to know the tools to be used. The initial meeting helped the observer gain a better understanding of the topic of the class to be observed as well as the Student Learning Outcomes (SLOs) for the course. Convenient scheduling of the observation was done at this time so that the observee would not be surprised as to when the observation would take place. The initial meeting provided an opportunity to review the observation tools that would be used and to help establish a safe, low stress, and non-threatening learning environment. The observee also highlighted the aspects that they wanted to be particularly focused on during the observation process (in this case observation on how much time was given to student in-class activities) and the observer ensured that those aspects would be addressed.

The second protocol of the low stress peer observation process was the Observation itself. It was important that the two parties had met before the observation, thus complying with the first protocol. During the observation, in accordance with the protocol, the observer was a silent viewer of the class and did not interfere in any way. They sat towards the back corner of the room for an optimal view of the class and its interactions. The observer made use of the three observation tools during the Observation session. Both the observer and the observee were well acquainted with the tools: 1. *Quantitative Checklist*, 2. *Faculty Class Flow Diagram*, and 3. *Qualitative Field Narrative*.

1. The observers used the specially prepared and easy to use Quantitative Checklist to help guide their observation of the instructional session. This one sheet checklist addressed aspects of the presentation (such as verbal/non-verbal forms of communication, and use of technology/visuals), interaction (such as class participation, asking of questions, safe environment), and knowledge (logical presentation of information, subject matter expert, more than just data) skills as observed during the class. The observer's utilisation of the easy-to-use checklist provided specific usable quantitative data (see appendix 1).

The use of different domains/aspects within a simple and easy to use checklist was incorporated in that such processes have effectively functioned in other instructional observations and teaching research such as that done by faculty from the Behavioural and Social Sciences of the University of Groningen, Groningen, The Netherlands (Noben et al, 2022). Another educational research, Jace Hargis, Higher Colleges of Technology, United States, in conducting over 100 observations of instructors in higher education, also expressed the validity and usefulness of a pre-established checklist of beneficial instructional behaviours/processes to look for during an observation (2014).

2. Additionally, the observer created a Faculty Class Flow Diagram to record faculty movements and student engagement. This diagram consisted of a rectangle to represent the instructor's desk and/or podium towards the top of the page (duly labelled) and smaller squares to represent each of the students desks/seats (along with a label of where the observer sat). An "X" was placed at the location of where the instructor was when they started the class and then subsequent "X's" were placed every 5 minutes or whenever the instructor moved around. The students squares' also had either a circle or a dash line placed inside of them with a circle representing that the student asked or answered a question, and a dash line meaning that the student was disengaged. The flow diagram was updated throughout the observation to provide an overall data source regarding physical dynamic movement and overall engagement (see appendix 2).

The inclusion of a Faculty Class Flow Diagram was done in that multiple research has shown the importance of instructor movement and proximity within the classroom (Gunter et al., 1995; Hargis, 2014; Fernandes et al., 2011; Mei et al, 2017). Heng Buai Chin, Cecilia Cheong Yin Mei, and Fauziah Bt Taib, educational researchers from University of Teknologi, Malaysia, in researching teachers' movements and proximity stated

Their actions indicate that the teachers cared about their students. Their actions also help foster solidarity between the students and their teachers, especially when the students see that their teacher is making the effort to help them. On the other hand, if the teacher confines herself to a fixed area near her table or computer, and rarely approaches her students, the teacher may be considered as "less immediate", and less approachable. (Mei et al., 2017, p. 83)

3. A final component of the observation was the Qualitative Field Narrative. This short (one-page) observational narrative write-up focused on specific aspects of the class and provided deeper insights and explanations to the information obtained through the Peer Observation Quantitative Checklist. Additionally, notes were made dealing with any other observations, items of interest, as well as any items that the observee asked the observer to take note of (see appendix 3).

Incorporating a field narrative was done to ensure that full qualitative information was captured to better enhance assessment efforts (Chism and Banta, 2007)). This was additionally based on possessive recommendations from Hargis's experience in observing over 100 faculty members as well as from a meta analysis of peer observation processes by Iowa Department of Education, Iowa State University researcher Jeffrey Fletcher (2018).

The third and final protocol of the low stress peer observation protocols to enhance instructor awareness and capabilities is the Post Observation meeting with two-way discussion. Proper handling of this meeting (held as soon as possible after the class) was very important. The meeting began with the observee (the faculty member who was observed) first sharing their personal perspective on how they felt the class went:

"I thought it went pretty well in general, but this is the first time that we are offering this course so we are still trying to iron out the bugs."

After the faculty's reflection, the observer shared their observations, purposefully given in an empathetic, friendly, and constructive way. The first observations shared were the Faculty Class Flow Diagram. This was specifically done as a way to ease into the discussion by sharing direct observations and constructive feedback. Next, the observer shared observations regarding strengths that were noted using the sections in the Quantitative Checklist and then provided greater details captured on the Qualitative Field Narrative document. In sharing areas to improve, the observer expressed their observations in a supportive way, allowing for the observee to comment as to why they did things in a certain way. The observer also shared their observation on the topic (time given to student in-class activities) that the observee specifically asked to make note of:

"It was great that you had multiple in-class activities because it helped keep the students motivated and helped them learn the material. I actually think it took a bit too much time because you ended up demonstrating the process and explaining yourself multiple times to the different student groups. You could try demonstrating it to the class as a whole and then having the groups go through it at the same time initially step-by-step." - Notice the low stress, non-judgemental, and friendly manner that the information was given. Given the low stress manner in which the observation was conducted along with the manner the observations were shared, the observee expressed that they were very accepting of the information and looked forward to applying during the next class.

The Post Observation meeting ended with the observer thanking the faculty member for letting them sit-in and expressed what they had learned from the experience as well (different communication style, different instructional techniques, and more experience in general).

3. Findings and Discussion

The implementation of low stress peer observation protocols yielded a beneficial experience for both the observer and the observee. The observer's anxiety/stress was lowered due to knowing exactly what to look for via the one-page checklist, but still had additional room to observe and

comment via the Faculty Class Flow Diagram and the Qualitative Field Narrative. Going through the certification process ahead was mentioned by the observer as greatly helping to be at ease with the overall process. Prior training in the low stress protocol was beneficial for all involved.

“I really liked how I knew all parts of the process, what was going to happen, what was happening, and it was great to at least somewhat know the person that was doing the peer observation. I thought it was a good process,” commented the observed faculty member.

The key aspect of ensuring two-way discussion throughout the whole post-observation meeting was also noted as highly important to help the observee (the faculty member) better realise what occurred, why it occurred, and other possible ways to conduct the class, without feeling defensive - leading better grasping of the information and willingness to improve. Hargis noticed similar findings in his research, expressing that having proper protocols for effective observations “...increased the trust and open conversations” between those involved.

4. Conclusion

The use of low stress peer observation protocols to enhance instructor acceptance and capability was shown to be effective and even enjoyable in this case study. Attempts are being made at this time to conduct many more peer observations in this manner to help validate this specific low-stress protocol process. Others are encouraged to use the protocols explained in this case study at their educational institution to see how effective and enjoyable the process can be for them as well. Peer observations are an important aspect of faculty development, but only if it is done in a manner where the faculty receiving the developmental information accept the info and then act upon it. The low stress peer observation protocols can directly help to ensure this beneficial outcome.

An additional area to explore deals with the creation of low stress protocols for self observations of teaching. Use of auto tracking equipment (example Pivo auto moving tripod) and AI can now allow for this possibility. Capturing of the audio portion of the class could also be analysed by AI via first transcription and then review to determine interaction/engagement activities, and even verbal effectiveness. Use of AI to help with instructor observation will continue to improve as the technology develops.

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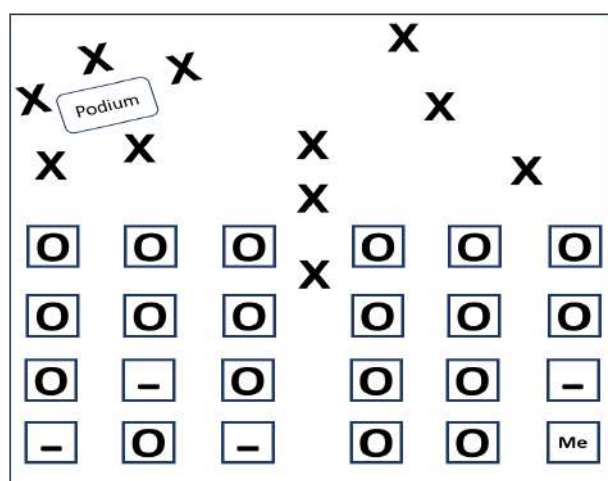
Appendix 1: Quantitative Checklist

Quantitative Checklist			
Observer Name and Title:			
Person Being Observed:		Date:	

Presentation Skills	Possible Area to Address	Neutral	Excellent	Not Observed	Notes
Pleasant-clear voice w/ proper projection and speed					
Avoids overuse of verbal distractors/crutch words (uh, umm, so, like, ok)					
Avoids excessive reading from notes or slides					
Maintains good eye contact and displays topic-teaching enthusiasm					
Good use of technology and visuals					
Interaction Skills					
Asks questions and seeks full class participation					
Uses active listening and provides feedback					
Approachable, safe-appropriate atmosphere and sense of humor					
Clear/effective with good classroom management					
Incorporates active learning components					

Knowledge Skills					
Presents material logically and at appropriate level					
Uses inclusive/diverse examples, ties in research					
Fully Expresses Relevancy					
Is Subject Matter Expert When Needed					
Goes beyond pure knowledge transmission					

Appendix 2: Faculty Class Flow Diagram



Appendix 3: Field Narrative

Class started with a warm greeting from the instructor. She then introduced the main topic for the day and incorporated a quick summary from the previous class. The instructor told the students that they would watch a short video and what to look for. Visuals were informative and of good quality. Direct questions were asked afterwards which then turned into a discussion dealing with the class topic. Instructor seemed to really know a lot about the topic and expressed a great amount of infectious enthusiasm. Almost everyone seemed to participate in the active discussion. A couple of students in the back seemed to try to pay attention and take notes but were distracted by messaging on their phone.

After about 20 minutes of discussion the instructor had the students break up into groups of three to perform a process dealing with taking a blood pressure reading and working with a patient. This did go as smoothly as possible in that I don't think the activity was properly introduced. A demonstration to the whole class would have helped as well as having everyone go through it step-by step initially and then within the scenario given. Students were also a little confused as to which students were playing which role, acting as a nurse, a patient, or a family member.

At the end, the instructor did a quick summary of the class, highlighted that some test questions will come from the active learning activity, reminded students of the reading, and then gave a warm goodbye. *Date*



3. Critical insights of instructional design of online reflective participatory spaces in an academic development course in Europe

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Abstract. This exploratory work provides critical insights before faculty evaluation of online reflective participatory spaces in an academic development course at the University of Crete.

Following the first online asynchronous course on Academic

Development at the University, this paper

focuses on explorations of online communities of practice construction parameters, and discusses critical instructional design strengths and weaknesses. After scoping literature review and through personal narrative of the Instructional designer, this work sheds light to areas that need to be taken into account by other instructional designers and academic developers who aim at further alignment and exploration of more inclusive course design that take into account target student and academic needs.

Keywords: MOOC; online community of practice; community of learning; reflective participatory spaces; instructional design

1. Introduction.

MOOC (Massive Open Online Courses) typologies vary from country to country and from institution to institution. As such, MOOCs may provide non-formal education in organised educational contexts and/or formal/nationally recognised certificates (Karachristos, 2020). A MOOC often aims to create learning and networking communities among participants with the cMOOC type (McAuley, Stewart, Siemans, & Cormier, 2011), to disseminate new input with the xMOOC type, and to combine the above while incorporating simple activities that contribute to a sense of progress and development of participants (tMOOCs) beyond simple knowledge transfer. The MOOC typology further suggests two development pathways, a) a nationally regulated one and b) one determined by global demands. The first category refers to formal niche market where MOOCs target a specific population and provide official recognition in one or more countries according to a specific institutional and regulatory framework. The second concerns informal mass-market MOOCs, as they address broad groups of learners in the absence of a national accreditation system (Tømte et al., 2017). Scandinavian countries tend to adhere to the first type (Tømte et al., 2020) whereas Greece adopts mainly the second with the exception of MOOCs organised by the Centres of Lifelong Learning (KEDIVIM) of Greek universities that also provide ECTS.

According to Conole (2014), MOOCs also consider twelve other crucial factors, such as openness and accessibility (both in terms of time and space), large student populations, use of multimodal multimedia, degree of communication and collaboration, staggered learning pace, quality assurance, degree of reflection, accreditation, formal and standardised knowledge, autonomy, and diversity. The high dropout rate, high production costs, and duplication i.e. copyright infringement are the key issues MOOCs confront despite their instructional design and positive reviews (Kalatzi and Simiakou, 2016).

The Teaching and Learning Centre at the University of Crete piloted its first MOOC on Academic Development through an online asynchronous MOODLE course. A total of 32 academics were invited by the Vice Rector to attend the course, acting as evaluators. The course had a duration of 8 weeks during the summer break. Each participant was asked to evaluate key parameters of the course regarding how useful, organised, interesting and well-justified the new input (content), activities and forum discussions were.

This paper aims to examine critical insights of a pilot MOOC Instructional design in terms of academic development and discuss how the structure, content, activities per module can be taken into account by academic developers designing relevant courses.

2. Literature review

A key theoretical foundation for many MOOCs is cognitivism and the 'Assimilation Learning Theory' (Ausubel, 1968). According to these theories, learning takes place through the association of meanings that make sense to the online learners, i.e. concepts that are well-defined, examples from real and contemporary contexts and environments, and formulations that encourage them to learn more about the topic of discussion, while seeking to develop higher cognitive skills (see Bloom's Taxonomy) (Krathwohl, 2002).

Evaluating prior knowledge before presenting new knowledge/input is equally important as it allows participants to have a better picture of their strengths and weaknesses and more motivation to improve or self-regulate. Self-regulation is considered synonymous with academic performance (Zimmerman and Pons, 1986) while 'learning how to learn' as a key component of metacognition (Winne, 1997) is associated with knowledge through critical reflection and meaning making

(Pintrich, 2002; Schraw et al., 2006). Learners' awareness of their own competences combined with their successful participation in learning activities empowers them and enhances their motivation to perform better as well as improve their own performance (Zimmerman and Bandura, 1994).

Self-regulation in MOOCs is often associated with motivation through active learning combined with cognitive association and active engagement with new knowledge or input (Mayer, 2004). The creation of quizzes and activities contribute to this direction. Also, in line with the principles of constructivism, many trainees pursue learning through interaction with the social network surrounding them.

Another theory that underpins MOOC instructional design is Information Systems Theory. It addresses issues of design, analysis and implementation when creating MOOCs, and appropriate use of learning management systems. User familiarity of platforms and relevant activities, and scalable activities are also important; hence, MOOC designers often need to create easy activities to create an initial sense of satisfaction and enhance a sense of belonging, and the gradual hierarchy of concepts from the simplest to the most abstract (Van Damme, 2006). According to Drake et al. (2015), the fundamental five guiding principles for MOOC design are as follows:

- Information that is crucial to understanding important ideas and their connections to reliable contexts.
- Engaging information and opportunities for communities of interest to participate, collaborate, discuss, while giving and receiving feedback.
- Measurable (visible and immediate) results so that participants can gauge their progress based on quantifiable successes.
- Inclusion and Accessibility
- Scalability, i.e., graduated in difficulty and with a tested learning pace that promotes involvement and the pursuit of advancement.

1.3 Structure and core values underpinning UOC Academic Development MOOC

The University of Crete for the MOOC "University Education: Teaching Methodology in Higher Education" adopted the model of equal relationship between participants and facilitators thus shifting the role of the facilitator from the role of the expert to the role of the co-LEARNER through a collaborative empowerment approach and allows for greater alignment between pedagogical principles and personal teaching practice (Debowski, Stefani, Cohen, Cohen, & Ho, 2012). Viewing academics as teachers who care and reflect on the quality of teaching, and experiment in different ways in order to improve it. In other words, participants were approached as dynamic subjects who already have, through their practice, considerable knowledge and experience related to teaching and wish to elaborate and enrich it. Course designers in this Academic Development MOOC did not follow a deficit training model (Kennedy, 2006) according to which experts present new input in order to remedy lacking or inappropriate teaching and learning conditions or values.

Following the most prevalent pattern in MOOCs that contain discussion forums, this academic development Mooc did so in order to enhance the sense of community and allow participants to exchange ideas and practices. As well as adding forums which contained prompts provided by the coordinators, it also included 'Peer Coaching' opportunities where participants were invited to bring up topics for discussion or problematic situations themselves in order to get feedback from

their colleagues. Debowski (2014) documents a shift in the discourse and function of Coordinators from a communicative (advisory or knowledge sharing) to a more coordinating role (Handal et al., 2014) as a result of the growing need to foster partnerships and active engagement with the community. Additionally, the Facilitators assume the position of the learner/equal partner, contributing to the community's transformation and exploration processes as well as challenging their own presumptions as Facilitators and the educational practices they support. Although Debowski does not refer to specific “online” or “academic development” courses, this approach was adopted by the TOTT Centre for Teaching and Learning as the most appropriate for Academic Development. More specifically, this type of MOOC included elements from the cMOOC type with the aim of networking through forums and reflecting afterwards by presenting new input through multimodal multimedia (xMOOC type). Multimodality was a key priority as the same input was presented through videos, as podcasts, transcripts and ppt slides, i.e. colour and black and white slides (according to the association's guidelines for people with low vision).

Expected learning outcomes and course requirements of those who wished to receive the certificate of completion as participants and evaluators of the course in the first two announcements. The thematic areas developed were related to eight modules: a. Student-centred learning, b. Inclusive learning, c. Curriculum reform and course design, d. Linking research and teaching, e. Formative assessment, g. Treating students as equal partners, h. Digital equity and i. Digital readiness. These themes were developed based on the needs analysis that preceded (Katsarou, Sipitanos & Katsampoxaki-Hodgetts, 2023). The writing of the new content/input was based on literature sources related to teaching practice and theory in higher education focusing mainly on contemporary evidence-based pedagogical and teaching approaches. The structure of each module followed the following pattern. Definition of the concept, b. Importance of the concept and literature evidence, and c. Practical strategies and tested approaches in other higher education contexts.

Engagement tasks consisted of reflective self-assessment activities, quizzes, matching activities, texts with gaps and discussion forums where teachers had the opportunity to reflect mainly on the feasibility of the practical application of the proposed strategies in their own context and field. Through forum discussions and peer coaching activities, instructional design aimed at providing academics with the opportunity to discuss, analyse and reflect on their teaching in their specific learning contexts. Following Swafford's (1998) principles for designing peer coaching activities, the priority in these discussions were to (1) provide opportunities to address specific teaching problems posed by themselves and their colleagues, (2) promote teacher expertise by sharing experiences with each other, (3) to solve authentic problems with each other, and (4) promote real-time reflection and problem solving by those involved.

The final task was again reflective in nature as participants were asked to answer the same question for each section: "After the end of module X, which of your beliefs about the teaching practice changed and why? Which of the strategies suggested by the presenters would you incorporate when designing your own lesson and why?"

3. Evaluation Questionnaire for the Academic Development MOOC

Using a Likert scale (1. Totally disagree to 5 Totally agree), participants were asked to answer question 4. Questions were:

- _Enter a hidden code of 5 random numerical digits and use the same code in all questionnaires:
- _Do you self-identify as:

_Which of your initial expectations were confirmed by attending the distance learning seminar?

_In the following sentences answer using the following scale from 1 to 1 Read each sentence and mark the answer that best represents how you feel or act:

1. The objectives of the course were clear.
2. The content was well organised.
3. The multimodal material (text, slides, audio files, activities) was useful.
4. Numerous examples and explanations were given to improve understanding of the material.
5. Bibliographic references contributed to a better understanding of the material.
6. Assessment methods were clear from the outset.
7. The input broadened my theoretical knowledge in relation to the thematic unit
8. Activities contributed to the exchange of views, reflection and question solving.
9. The unit provided several opportunities for practical application in my course.
10. The content was useful.
11. The activities were useful.
12. Input presented contained valid scientific sources.
13. My experience of the distance learning process was positive.

In the following open ended question (space), participants were asked to complete the following:

_Here you may suggest changes to the platform, content, presentation and anything else you think should be changed to meet the academic development needs.

3. Instructional design reflections and potential needs for adjustment

Instead of using the knowledge-transmitting xMOOC model as a core component of the course, the course designers adopted reflective participatory learning models where participants (i.e., academics) and course designers talk and learn together as equal partners. As such, the cMOOC model was combined with the presentation of new input, and participants were encouraged to take positions on important educational issues knowing that their varied experiences and knowledge greatly aided in developing a multidimensional understanding of their local contexts and overall learning in reflective participatory communities of practice.

Feedback was requested in participatory communities of practice that to promote discussion, reflections and collaboration among academics encouraging their own voice to be heard, and in conjunction with course designers' intention not to provide training (in order to remedy deficit learning environments). Target feedback from participants needs to attest what kind of activities were considered more beneficial in terms of content focus, scope of research, mode, enhancement of reflection, and empowerment of participants' sense of community of practice. Based on the literature review, discussion forums and peer-coaching forums are expected to have increased participants' sense of belonging, sense of community practice and sense of ownership.

In an attempt to reflect on the effectiveness of instructional design of this pilot, we take into account the analytical framework of Drake et al. (2015). In line with Drake et al. (2015), there are several parameters such as organisation, justification of claims with valid sources and presentation of new input (content) that ought to be positively evaluated. An important parameter is platform familiarity and accessibility as lack of it may hinder participants' access, engagement and progress in the course. Also, in order to prevent low participation in activities, instructional designers need to use a platform that records and renders participants' active engagement in forums visible. Regarding the

scope of the coverage of the field, instructional designers need to provide a variety of examples or teaching scenarios in specific subject areas, particularly in sections where the input challenges the effectiveness of established practices in higher education.

Regarding the MOOC typology from McGrath et al. (2017), special attention needs to be given to design parameter regarding what may affect participants' perception of institutional strategic positioning through the MOOC in a positive or negative way. For example, if a participant questions the underlying ideology that is assumed to be promoted by the coordinators, facilitators or authors, then instructional designers need to take corrective actions in order to ensure that the Institutional strategic positioning is clear from the very beginning of the course. More specifically, if, for instance, a participant claims that American ideologies and practices are being taken for granted and presented as correct without taking into account the local contexts, it is germane for instructional designers to avoid ignoring such comments and pursue further investigation in terms of how inclusive instructional considerations are manifested.

In the same vein, and since academic development courses generally tend to challenge established hierarchies between lecturers and students, instructional designers need to take into account the local mentality and culture and provide evidence-based literature only to justify any suggestions or claims. Also, not providing useful links in participants' first language or sharing only publications from international contexts, other than the local one, may decrease participants' sense of belonging and engagement. This example cannot be perceived as an inclusive trait as many academics may not be speaking or able to understand English papers. In line with the above examples, recent research prioritises respect for the language, culture and knowledge base of trainees (Morgan 2023) as a prerequisite before eliminating inequalities. This is a particularly daunting task as academic development in some European countries, like Greece, is still in its infancy and the relevant research-based literature on teaching methodology in higher education is limited and exposure of academics in concepts that challenge established hierarchies such as *Students as Equal Partners and Inclusive Education* is often quite low. As such, heavy reliance on addressing inequalities between students and faculty should take into account academics needs and challenges given their combined administrative, teaching and research roles. Regarding the first aspect of this criticism, course designers deliberately hired doctoral students to document the new academic development input based on evidence based research in order to highlight possible inequalities between faculty and students. In terms of increasing representation opportunities of faculty voice regarding needs and challenges in their attempt to implement new methodologies, instructional designers can make sure that discussion forums like peer coaching are a very promising space for reflective participatory learning and development.

Peer coaching takes place in a mutually supportive relationship (Neubert & McAllister, 1993) through which colleagues/peers provide mutual help, feedback and support and share their experiences in their specific field and context in order to enhance teaching and learning conditions (Kohler et al., 1997). The effectiveness of a learning approach within such an environment may include peer coaching and peer assessment in different areas (Papadopoulos, Lagkas, & Demetriadis, 2017). However, peer assessment was not used in this course in an attempt to enhance the sense of trust and belonging of the participants and their belief that they share their experiences and knowledge as equal partners (Swafford, 1998) without the likelihood of losing face due to potentially negative assessments.

4. Conclusion

Although this pilot course was designed so as to be inclusive and beneficial by most participants, limitations such as piloting it during the summer months, the low number of participants in general, in discussions and peer coaching forums, as well as the low number of completion did not provide enough data for generalisations and conclusions about the effectiveness of the design. However, it is germane to mention that the community of practice approach with academics as subjects with extensive experience and knowledge about teaching issues may contribute to the positive evaluation of the course. Nonetheless, further research is necessary regarding peer coaching and online discussion forum attitudes of the participants that indicate the sense of community and possibly ‘sense of belonging’.

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4. Towards a Pedagogy of Care in postgraduate education

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Abstract. This study is a formative evaluation of a writing intervention, framed by a pedagogy of care, and intended to enhance the writing practices of postgraduate students while supporting them socially through the challenges of postgraduate study. The study was guided by the research question: how could a pedagogy of care be created in an online postgraduate learning environment? The intervention's core emphasis on a pedagogy of

care fostered a supportive and nurturing environment, contributing to students' growth as proficient writers. The evaluation revealed positive outcomes, including development in the students' writing skills and growth their confidence as writers. Additionally, the intervention's holistic approach facilitated the establishment of a collaborative writing community, fostering a platform for mutual growth and development for both students and supervisors. This study underscores the significance of integrating a pedagogy of care within academic interventions, highlighting its potential to create an enriching and inclusive academic community.

Keywords. *Pedagogy of care; writing; postgraduate learning environment; collaborative wiring community*

1. Introduction

During the pandemic the focus of actions was getting students off campus and online in a short space of time – and many institutions managed to do this incredibly quickly and extremely well – but encountered a number of challenges, in particular the social isolation of students in the online space (Belluigi et al., 2020). Most studies of emergency remote teaching, and the variations on this format that followed, focused on undergraduate students. In this paper, the focus is on online postgraduate education during and post pandemic. We know from the undergraduate literature that the online environment amplifies inequalities and social isolation; it does not diminish them thus there are consequences to a rapid “pivot online” (Belluigi et al., 2020). The pandemic has had a disproportionately large impact on poor, marginalised and vulnerable students. It is therefore important to be cognisant of the different learning environments and needs of postgraduate students and their access to learning resources, devices and data, as well as a safe space to learn. Moreover, being in the online space as long as students and academic have, is not conducive to well-being. Given this context, what is the possibility of creating a pedagogy of care in an online postgraduate learning environment? This is the question that this study addresses.

1.1 Literature: postgraduate education in an online environment

In undergraduate education there has long been an understanding that the ways in which university teachers support and interact with their students is important both for student learning and for their more holistic development (e.g., Brookfield, 2015). Teaching and learning interactions in the online environment have been of increasing interest and concern during and following the pandemic (e.g., Palahicky et al. 2021). The interactions and support that characterise postgraduate education have been less well researched. The supervision of postgraduate candidates has largely been an assumed practice in which experts in a field pass on their knowledge to newcomers and induct them into particular ways of critical thinking and problem solving, while acquiring specialised research skills (e.g., Golde and Walker, 2006; Maldonado and Herrera, 2019).

There is, however, a growing literature that critiques “traditional” postgraduate supervision as a pedagogy that is “hyper-individualised” (Heim, and Heim, 2023) and too narrow in its specialization and focus on research skills to be able to address transdisciplinary societal problems (Nerad, and Heggelund, 2008). Hierarchical research supervision models have been critiqued as having “their genesis in an asymmetrical master-apprentice power dynamic” which tends to reproduce the inequalities of its elitist past (Maistry, 2022). There has also been critique of the excessively demanding workload on postgraduate candidates and the concomitant pressure to publish (Kreber, 2023). The competitive nature of some postgraduate programmes contributes to stress, burnout, and mental health challenges (Manathunga, 2007). Issues of access, preparedness, inclusivity, and the push to fast-track increasing number of postgraduate students, despite their different levels of readiness for postgraduate study are of concern (Maistry, 2022). Postgraduate education may be also less accessible to individuals from disadvantaged backgrounds due to financial constraints or lack of support. A mismatch with job markets has led to postgraduate underemployment and difficulty transitioning to non-academic careers (Gruszczynska, and Piquerez, 2019).

The research literature tells us that educational challenges and inequalities are exacerbated in online environments, and that we should be mindful of the unintended consequences of decisions made in

a hurry (Belluigi et al., 2020). There is limited research-informed guidance for research supervisors to navigate these complex conditions, particularly in the shift to online research supervision. All of this points to the need for critical reflection on pedagogies of postgraduate supervision (Nixon et al., 2019).

2. Theoretical Framework

Concerns for the well-being of postgraduate candidates and their supervisors in the online environment, have resulted in a small collection of studies that explore the possibilities of a more caring approach to postgraduate supervision. A "pedagogy of care" emphasises a supportive, nurturing, and empathetic learning environment in which supervisors recognise the holistic needs of postgraduate candidates by creating a sense of belonging, emotional well-being, and social connection. This pedagogical approach is particularly relevant for overall student well-being, noting that the pressure for "timely degree completion, skill development and employability" poses challenges for a pedagogy of care in postgraduate education (Kreber, 2023). A pedagogy of care requires supervisors to be concerned with the whole student: their emotional and psychological needs as well as their intellectual development.

Noddings' (2012) pedagogy of care was drawn on to frame this study on postgraduate education. There are four key elements to Noddings' approach: 1) Modelling, 2) Dialogue, 3) Practice, and 4) Confirmation (Noddings, 2012). Modelling is foundational to a pedagogy of care in which educators become role models who exemplify care in the teaching and learning relationship. Productive and caring dialogue between students and teachers is relational and attentive to assumptions while foregrounding active listening, genuine respect, and critical thinking. The component of practice emphasises the active nature of care, care happens in the practice of teaching and learning. Confirmation affirms students' progress and celebrates their strengths, helping them to construct "agentic identities" (Noddings, 2010). In the context of postgraduate supervision, this would involve building strong supervisor-postgraduate candidate relationships, actively listening to students, and creating spaces where students feel valued, respected, and understood.

The pedagogy of care is a critical pedagogy, that questions the assumptions of traditional teaching and learning (or in this case research supervision) practices. In implementing a pedagogy of care, it is important to constantly reflect on practices in order to "avoid becoming complicit with the rhetoric of the status quo" (Zembylas, 2018). This is an important point, and a reminder that implementing a pedagogy of care can be challenging, and vigilance is needed to avoid positions of "privileged irresponsibility" or gender stereotyping in the giving and receiving of care (Zembylas, Bozalek, and Shefer, 2014).

This is not to suggest that a pedagogy of care should not be attempted because what is the alternative: pedagogies of indifference, of flawed assumptions, displays of power, shaming, sarcasm, instilling fear, passive aggressive questioning? The online environment can exacerbate many of these harmful pedagogies, partly due to the social isolation experienced by students when learning online. In the practice of a pedagogy of care the following are attempted (even if there are flaws): mutual respect, engendering authentic dialogue that attends to preconceived assumptions, enacting compassion, affirmation, and investing in transformative action (Noddings, 2010). While a pedagogy of care may be aspirational, and while mis-steps in the implementation are to be expected, it offers a beacon of hope when trying to teaching in challenging times.

3. Intervention and Methodology

This study is a formative evaluation of an online intervention intended to foster a pedagogy of care amongst postgraduate students and their supervisors. Formative feedback is important in contexts of innovation, particularly when the continuous improvement of the intervention is possible and desirable (Flagg, 2013). In educational evaluation research, there is usually some overlap between research and teaching processes, planning and evaluation, as well as between researchers and practitioners (Nevo 2013). This was the case in this study and the separate sections of the intervention and the evaluation project are outlined in the sub-sections that follow (understanding that there was overlap between the two). The next sub-section describes the postgraduate supervision intervention.

3.1 Intervention

Postgraduate education is a long and difficult journey, even at the best of times. During the pandemic it was particularly arduous as human contact was often replaced by asynchronous video-based learning, the completion of numerous academic writing task and difficult-to-understand processes, particularly for new postgraduates. In the institution that is the site of this study, the postgraduate journey starts with registering a topic and finding a supervisor (or supervisors) – and obtaining approval from the relevant departmental and faculty committees. Then there is proposal writing and ethics clearance – often a long, protracted process – before data collection and analysis can be undertaken – and the final study slowly begins to take shape. The “glue” that holds these processes together, and is foundational to postgraduate education, is the candidate/supervisor relationship, which – as many research studies show (e.g., Nerad, and Heggelund, 2008) – is key to a successful and affirming postgraduate experience. Also important is candidates’ ability to engage with the research literature as this will inform many of the decisions made at every stage, and equally important is the ability to undertake the many academic writing tasks that postgraduate candidates encounter at each stage of the process that they will be spending much of their time on. The intervention was not intended to replace the candidate/ supervision relationship, but to augment it. The postgraduate students’ reading journeys were, to a limited extent, addressed by seminars and workshops, as well as opportunities to participate in specialist reading groups, locally and internationally, related to their topic and/or theoretical approach. However, what we found to be missing was guidance and support in the process of writing up the different elements of the study. This is the issue that a group of four supervisors decided to address, through creating an online writing group. The postgraduate students were consulted about this, and collaborative the four supervisors, and their postgraduate students, conceptualised an online writing group that would met once a week on a Wednesday evening to practice academic writing, and to talk about writing. There would be no formal supervision, only writing. The supervisors would work on their own writing tasks (such as writing a paper for publication), while the students worked on writing up sections of their thesis. Time would be set aside both for actual silent writing as well as for general discussions about writing. The goal was to create an inclusive and safe learning environment that enabled students and their supervisors to thrive not only academically but personally and professionally.

3.2 Methodology for the formative evaluation of a postgraduate education intervention

Because the planned intervention was primarily intended to be responsive to the needs of the postgraduate students, it was felt that a formative evaluation should be implemented to ensure that changes could be made quickly, as students' needs changed. A formative evaluation focuses on feedback and information gathered during the implementation of the intervention to provide ongoing insights and recommendations for improvement rather than an assessment of final outcomes (Patton, 2008). Cousins and Whitmore's (1998) process for the participatory evaluation of educational interventions was followed. The goals and objectives for the formative evaluation were set by the postgraduate candidates who determined that the chat data rather than video recordings should be used by participants to comment on their progress and request changes. It was also decided that at the end of each term (approx. every 8 weeks) an online satisfaction survey would be conducted and discussed for the purposes of implementing suggestions and changes the following term. The postgraduate candidates thus provided valuable input during the evaluation process and were involved in designing the end-of-term surveys. The group of four supervisors who were instrumental in starting the intervention analysed the chat and survey data to identify trends, patterns, and areas for improvement. These findings were presented to the larger group and there was consultation on which of the recommendations and suggestions to implement in the new term. The writing group began in May 2020, and has undergone several iterations since then – and has attracted many new members.

The larger group agreed that the anonymized documents that recorded the process, findings, and recommendations should be kept both to inform future iterations and provide valuable insights for similar initiatives, and could be used for scholarly publications or conference presentations. The formative evaluation data was particularly valuable for refining and enhancing each iteration of the writing group structure and content. Ethics permission to use the anonymised chat data and survey data was provided by the Education Faculty Research Committee.

4. Findings: towards a pedagogy of care in postgraduate education

In this section, the key findings from the analysis of the online chat data and end-of-term survey is presented, drawing on the framework provided by Noddings' (2012) pedagogy of care to analyse the data.

4.1 Modelling: sharing is caring

The first intention of the writing group was to share practices. This was in order that novice writers could learn from more experienced writers. For example, when a postgraduate candidate posted that she struggled to write “on a clean page” (PG1), a postgraduate supervisor posted the following message in response:

I also hate a blank page. I find that working out the structure first means I can create headings and sub-headings and then start writing anywhere under one of the headings (S1).

It was not only the students who found academic writing challenging, more experienced writers also struggled with their writing, and sharing practices made them vulnerable – but also more relatable in sharing their successes and failures, as Supervisor 2's chat post revealed:

My goal was to produce around 400 words tonight – but I really struggled to get started – my research categories were in a bit of a mess – so I only managed 150 (S2).

A postgraduate student posted a “caring” icon and sent the following message:

So sorry Prof, but I can relate (PG2).

Several of the chat messages included similar exchanges between the students or between the students and supervisors, creating a sense of solidarity and community as we all battled with our various academic writing tasks.

The postgraduates had considerably more experience than the supervisors in using online writing tools – from concordances and academic word lists, to AI writing tools, such as Quillbot, and more recently (and perhaps controversially) ChatGPT. Most postgraduates spoke English as an additional language and found these tools useful for correcting their grammar or achieving better fluency. For example, a student shared that she asked ChatGPT to assist her as follows:

Here’s the prompt I used: Could you please help me to improve the following paragraph ... (PG3).

When a supervisor expressed concern, the student responded:

Prof, let me help you set up an OpenAI account, then you can try it and see for yourself how it works. It’s more like having an editor go over your work. It’s not getting ChatGPT to write your thesis for you (PG3).

Despite the concerns about some of the AI writing tools, the writing group was a safe space for sharing practices. The students were open about their use of AI tools to improve their writing and were practising the reciprocity which characterises a pedagogy of care. It became increasingly obvious that the students could also teach the supervisors. Sharing practices extended beyond the supervisors modelling their writing practices for the postgraduates, but included the students modelling their writing practices for the supervisors.

The first-time supervisors also learned from the practices of more experienced supervisors and the feedback provided by the students, as the following novice supervisor commented:

I'm still a novice supervisor. Thank you all for sharing, I’m learning from these workshops and hope I’m becoming a better supervisor (S3).

Another novice supervisor wrote:

These are really useful resources and guidelines [following a discussion of AI writing tools], much appreciated. It also helps with ideas and advice that I can use in reviewing my postgrads work as well (S4).

4.2 Dialogue: the student is the curriculum

From the start of the writing group meetings, the students set the agenda. The group facilitator for the evening session addressed issues before the start of the silent writing sessions, as well as after the sessions. The supervisors had been providing some general writing tips, but the students explained that they wanted something less generic and more focussed. The following is an example of a student stating her needs:

General tips are good, but I think that it would be useful to have several sessions on writing up different parts of the thesis. Thank you! (PG5).

Another student wrote:

I find the sessions so useful as I work through my thesis. Since I am at the discussion part of my chapter on the findings now, I will find tips on writing this and the conclusions chapter, very helpful (PG6).

Another asked for:

Tips on writing up the data from interviews where I am busy now and perhaps please repeat the tips on writing the literature review (PG7).

When one of the postgraduates requested some input on “how can the author make the most out of AI tools for academic writing?” (SG7), it was the perfect opportunity to hand the whole session over to the postgraduates themselves, who were much more experienced than their supervisors (as illustrated above).

4.3 Practice (makes perfect)

The weekly meeting included two 25-minute silent writing sessions. The site was opened for a general “catch up” conversation before the start, and the designated facilitator provided a short (ten-minute) input on one of the issues that the postgraduates had raised (e.g., writing up the discussion section) – and directing students to readings and resources. Thereafter, everyone, – both the students and the supervisors – shared their goals for the evening’s writing session by expressing putting in writing in the chat. Below are a few examples of the goals:

My goal is writing up the first draft of the background/introduction of my article (S2).

Good evening all. My goal is to write a journey of one student i interviewed. I have coded the transcript already (PG3).

Following the goal-setting exercise, the group wrote in silence for 25 minutes, after which there was a five-minute break in which the writers met to share their progress (or lack thereof). Usually they did this orally – but some chose to write what they had done during the first 25-minute session:

I had a lightbulb moment two days, nights ago, wrote it in the journal that I keep next to my bed but couldn’t get around to weaving it into my thesis. But I am sitting down now and I am tackling it (PG6).

After the mid-session break, writers wrote in silence for another 25 minutes. And then shared what they had achieved. A supervisor wrote:

Good progress, but slow process. Good to have this space (S2).

A postgraduate reflected on what she had achieved:

I also didn't do exactly what I thought I would but inadvertently made such a leap ... I started writing my own reflections. This was such a great space for me just to vomit all my words (forgive that I use the word vomit but it's the only word that really describes what happened) (PG7).

The extent to which both students and the postgraduate candidates felt comfortable about sharing their writing practices – the good, the bad, and the ugly – is an indication that a safe space had been created for learning about writing, growing, and building confidence as a writing in a spirit of collegial support.

4.4 Confirmation: you got this!

The group affirmed one another and shared their small (and large) writing victories, whether it was the submission of a thesis chapter to a supervisor, getting positive feedback, finishing an article, or even just attaining a writing goal:

Wow! This was great thanks. I reached my goal and might even put in some extra time. Thank you so much. This was a brilliant experience (PG6).

These affirmations confirmed that the postgraduates were growing and developing as writers, and that the online writing group was meeting their needs. The following are some comments from the postgraduate students in the end-of-term survey:

What you do is great (PG3)

I enjoy all the ones you are sharing, thanks! (PG8)

I listen to all the recordings, they are great! I learn things that my supervisors don't think of telling me (PG9).

4.5 Coda: caring for the supervisors

Having listed all the things that supervisors needed to accomplish in offering care to the postgraduate students, it is important to acknowledge the incredible work done by the supervisors, who bore the brunt of the shift online. They worked long hours gave up precious family time or personal time every Wednesday evening (often staying on to discuss a writing issue long after the end of the meeting), and working through the mid-terms breaks – all in order to create a caring environment for students and enable them to progress their thesis writing. The supervisors continued to support their own students outside of the weekly writing meetings, by conducting supervision meetings or giving individual feedback. Many supervisors assisting students financially, provided ebooks, and in at least once case, when a student's laptop was stolen, provided a laptop that she could use and helped her to replace the lost data. Supervisors also offered emotional support at a time when family members might be sick or have lost their livelihoods. The pedagogy of care thus extended beyond the confines of the writing group into the broader space of holistic care in an educational context.

5. Conclusion

The COVID-19 pandemic and rapid transition to online postgraduate supervision revealed many injustices in traditional supervision pedagogy – but also opened up spaces for innovation and change and revealed many possibilities for ethical and equitable supervision. Many of the postgraduates that joined the group in 2020 have subsequently graduated, or have made considerable progress in writing up their thesis. The online writing group reminded participants of what matters most: relationships, care, and compassion. This emergent understanding should not be forgotten, as we return to our various versions of the “new normal” in postgraduate supervision. A

pedagogy of care is particularly relevant in today's educational landscape, where mental health and well-being are important considerations for both students and educators. It reflects a commitment to creating a compassionate and supportive educational environment that promotes not only cognitive development but also emotional growth and resilience.

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5. University Pedagogy: A new challenge for higher education in Greece

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Abstract. In recent years, higher education has been at the center of national and European education policies. This work is an attempt to investigate the field of University Pedagogy in Greek universities. In particular, we examined the external evaluation reports and the quality policies of the undergraduate study programs that have been posted in the departments of Panteion University in order to examine whether European policies have affected the structure of the studies, but mainly we investigated whether the emphasis is on teaching and research. As can be seen from the analysis of the evaluation reports, research is a key mission of universities,

great emphasis is placed on the evaluation of students as well as on the utilisation of technology. However, there is little or no reference to teaching style, little support for academics to improve their teaching either through the use of audio-visual media or through exchange and reflection among academics, making teaching a solitary activity.

Keywords: *university pedagogy, challenge, higher education*

1. Introduction

Recently, there has been an increase in research on the effects of the pandemic on secondary and primary education, but little mention is made, however, of the challenges that higher education has to face. Often, higher education and the educational process in higher education institutions is downgraded, or rather, it does not seem to receive due importance neither by the political leadership of the Ministry nor by the competent bodies within the University. In Greece, in order for someone to teach in secondary or primary education, the Ministry of Education requires the educational candidate to have a pedagogic training certificate¹. However, the same is not true for higher education. Possession of a PhD along with research work and publications is often the ticket to teaching in higher education. With the above, we do not belittle the effort that goes into completing a PhD or a research project, but the fact that someone is a competent researcher does not mean that they are also a competent teacher at the same time. In other words, the question remains whether the preparation of scientific research is enough for an effective teaching and what criteria we can evaluate university teaching as effective. Academic development courses for university professors is now institutionalised in universities in the United Kingdom, Norway and Sri Lanka and is becoming increasingly common in many countries (Gibbs G. and Coffey M., 2004:88). In order to see whether and to what extent the teaching competence of the Higher Education teachers, the educational processes and the teaching methods are taken into account in the Greek academic institutions, we chose to examine the evaluation reports of the Panteion University departments, as well as the results, where possible, of the evaluation questionnaires that are distributed to the students upon course completion. The reason we chose this particular university is firstly because it is the fifth oldest Higher Education Institution and the first school of political science in Greece that gathers a large number of students and secondly because it is a university that mainly teaches theoretical courses.

2. Teaching vs Research

Teaching and research are the two pillars of higher education. In the context of globalisation and the effects of European education policy, universities are called upon to play a new role that often deviates from the Humboldtian model. University teaching is being re-examined and re-evaluated in the context of globalisation, the role that universities are called to play in the new socio-economic and technological developments - that is, to connect with the labor market - but also to respond to the challenge of the massive influx of new students. Despite all this, we see that in Greece, as well as in other countries, there is little or no talk about the pedagogical training of faculty members². There are not a few researchers, but also university professors themselves, who believe that teaching and research are interrelated, that research feeds teaching. But there are also teachers who consider teaching to be a "necessary evil". According to Anderson et al "the educational tasks in many science schools in the USA. they often receive the pejorative label "teaching chore" (Kedra, 2016).

The degradation of teaching is also partly due to the fact that universities are at the center of knowledge production through research. Many companies invest large sums of money in conducting research, with the result that a number of scholars talk about the transformation of the university into a business, the "Knowledge business", as mentioned in an article by the Economist. According to the article, "Universities are experimenting with new ways of financing (mainly through student fees), forging partnerships with private companies and participating in mergers and acquisitions. [...] Universities are among the most important engines of the knowledge economy" (The Economist, 2005). According to the World Bank, global spending on higher

education amounts to \$300 billion per year, or 1% of global economic output. There are more than 80 million students worldwide, and 3.5 million people employed to teach them (The Economist, 2005). Universities, as we mentioned above, are at the center of the production of new knowledge and both themselves as organisations and lecturers have entered the process of competition at many levels, such as attracting funds for research, attracting new students, the best position in the world ranking. After all, academic research and publications in scientific journals are the two main criteria for attracting funds, the international ranking of universities, but often also for academic advancement. Therefore, research and publications are what confer prestige, in contrast to teaching (Gougoulakis, Oikonomou, 2014:23).

In the context of the new role that universities are called to play, in the last two decades there has been a strong interest on the part of the European Union in higher education and in drawing up a common European map in education with the aim of the "Knowledge Society". Such policies are found in the Bologna Process and the Lisbon Strategy, which focus heavily on linking higher education to the labor market with the aim of increasing the employability of graduates. The extroversion of universities that has been attempted in recent years has also affected the responsibilities of the academic staff, which are increasing and expanding beyond the field of teaching. Among them are the search for resources to carry out research, the intensification of cooperation with the private sector for research purposes, in some cases even the latter's involvement in targeting and determining the scientific branch to which the research will be directed. The fact that state funding is reduced and academic institutions are asked to find resources from private companies, combined with the evaluation of professors and by extension universities to attract resources and their international ranking seems to have resulted in the adoption of the culture of entrepreneurship from higher education. Thus, we observe that faculty members are tasked with a range of activities beyond purely teaching and research-related activities of an administrative nature (Kimourtzi P., 2010:151, in Greek).

3. The effects of European conditions on Greek higher education – The adoption of external evaluation reports and the quality policy of the PPS

More and more recently there is talk of connecting universities with the market. According to the guidelines coming from the European Union, through the Agreements where the main objective of the changes is "the response of higher education and research systems to the external needs and challenges of globalisation and intensifying international economic competition on the one hand and technological changes and of their consequences in the economy and work (Greek higher education in an international perspective, p. 33). In this context we see that now the educational policy in the light of the neoliberal influence is not only the adaptation of education to the needs of the economy, but its adaptation to the needs and specifications of the market. This is also evident from the terminology we now use regarding the professional development of teachers. The evolution and progress of teachers is now measured in terms of effectiveness, efficiency and competition (Vergidis, 1993: 44).

Within this context, teaching and teaching work become the subject of evaluation. For the first time, the Supreme Authority for Quality Assurance in Higher Education (A.D.I.P.) in its Annual Report in 2010 – 2011 finds that teaching follows traditional teaching methods and only a small number of Departments utilise technology for active education and student participation (Kedra, 2016:32). Law 3374/2005 on Quality Assurance in Higher Education defines the teaching work as one of the evaluation objects to which all higher education institutions in Greece will now be subject. Indeed,

by doing a search on the websites of the departments of one of the universities of Athens, the Panteion University, we see that the corresponding reports have been posted. Of course, the common element of all is the focus on research and the evaluation of students in various ways. As noted in one of the reports, the goal is "to ensure the quality of the teaching/educational work offered, on the one hand through the use of new technologies, alternative and attractive teaching methods and techniques that favor the active participation of students, on the other hand through the transparent, merit-based procedures for the selection and development of teachers who are distinguished, in Greece and abroad, for their research/scientific work" (Quality Policy of the Department of Social Anthropology). As is evident in the above excerpt, there is talk of the introduction of new teaching methods, which favour the active participation of students, but there is no talk of how this will be done, while the large number of students corresponding to each professor is not taken into account. In the second part, regarding the selection of the Teaching Educational Staff (DEP), this is based on the research and scientific work and not on the educational/teaching. In almost all the quality policies that have been posted in the respective departments, there is no mention of the pedagogical training of the teachers.

In another text where special mention is made of "Ensuring the link between research and teaching", the focus is more on familiarising students with scientific research and less on the pedagogical training of academic staff. As stated, in order to implement the connection between research and teaching, "methodologically oriented courses and seminars are offered so that students acquire high-level knowledge and research skills, opportunities are given to deepen research through participation in workshops and opportunities to participate in national and international research". (Undergraduate Curriculum Quality Policy, Department of Political Science and History). As can be seen, there is an emphasis of the study programs on research, which is one of the main pillars of the University, but there is no emphasis on teaching them.

At this point it would be very useful to see the questionnaires given/distributed to students in order to evaluate the teaching of university courses. The two main problems that we can identify focus on the small number of questionnaires in relation to the number of students enrolled per course and the total number per department³ on the one hand, and the fact that the questionnaires do not provide the possibility to conduct qualitative results except quantitative. More specifically, with regard to teaching, by drawing data from the structure of the questionnaires that are posted and distributed to the students as part of the evaluation, we notice that they are closed questionnaires, which do not allow the student to make a meaningful evaluation. As an example, here are some questions that were asked in the questionnaire: "The material used for the course helped me to understand it", "Different forms of teaching were used which complemented each other", "From teaching the course I learned to look for ways to document different points of view", "They used the technology for the teaching of the material and the practical application". The majority of students answered positively to the above questions. However, we cannot know what these different forms of teaching were, how they complemented each other, what material was used to understand the lesson, what different educational tools were introduced, apart from the lecture, and how they were utilised in the educational process.

Turning to the internal evaluation report of the Social Policy department in the section on student-centred teaching it is pointed out that a variety of pedagogical methods are adopted in a flexible manner. However, these various pedagogical tools (work supervision, special meetings, personalised interviews) are mainly applied to the cases of Erasmus+ students, as well as to the cases of students with special needs. Something similar is difficult as it seems to be carried out for

all students, for this reason the seminars are considered necessary, where they require a small number of students, a fact that favours the cooperation between student and professor (Internal Evaluation Report of the Department of Social Policy). However, we must not overlook the fact that the classic way of evaluating students, [determining specific material, memorising, grading] remains the only criterion for evaluating and grading the student, a fact that invalidates any attempt to adopt another pedagogical method.

At this point it is useful to mention that with the law 4009/2011 no. 51 provides for "the establishment and operation of a single and independent teaching support office per department, especially for the utilization of new technologies in teaching". Within a few lines, the legislator's image of teaching in higher education is captured. Many consider this to be the first step towards the implementation of university pedagogy in Greece. However, in the specific law there is no mention of teacher training as individual issues should be specified such as who will be staffed by these offices, what structure they will have, the time period of the training and above all the issue of the practical application of teaching methods is not covered. The specific article of the law therefore cannot be considered an introduction to university pedagogy in Greece as its role is supportive and is entirely related to the introduction and utilisation of new technologies in higher education. The goal of university pedagogy, however, is not (only) the utilisation of new technologies in teaching but specific teaching practices and approaches of teachers during the planning, implementation and evaluation of the learning process (Gougoulakis, Oikonomou, 2014:13). Among other things through University Pedagogy, teachers in Higher Education institutions should have developed a series of skills and abilities such as those of teamwork and cooperation, communication, analytical and critical thinking, adaptability, management of emotions, of problem solving (Fragoulis, Balkanos, 2016: 164).

From the study of the external evaluation reports of the Panteion University Departments, we notice that in one of the reports, that of the Department of International and European Studies, emphasis is placed on the shortcomings and problems of the educational project and solutions are proposed. Some faculty members want a more systematic approach to teaching evaluation, while students feel that a more effective channel of communication with faculty members should be established. As pointed out in the report, there is no official pedagogical policy and electronic teaching (e-class) is in a pilot phase. In order to address the issues raised in the Curriculum and Instruction section, it is proposed to establish a Learning Laboratory, the responsibilities of which will be to provide training courses to support new teaching techniques with which Faculty Members are not familiar, it will assist in the development of e-learning/teaching, will provide training on how to develop up-to-date course material and teaching materials, will provide training on supervision techniques, while the Assessment Committee appears to be proposing alternative examination methods by course type. (External evaluation report, Department of International and European Studies, 2014: 16 – 17). We do not know if the specific workshop is working, but the fact that it has been proposed since 2014 is encouraging as it recognises the difficulties faced by faculty members in conducting the courses, while the self-evaluation process of teachers and the better use of questionnaires is deemed necessary⁴.

4. University Pedagogy Practical applications

The lack of a pedagogical training certificate for members of the academic community is not a peculiarity of Greek higher education institutions, but in most European countries teachers in higher education do not need a pedagogical training certificate. Examples of the implementation of University Pedagogy in Greece can be drawn from countries in which it is applied. In Finland,

training is not mandatory, but all teachers are given the opportunity to attend some pedagogical courses (Postaref, Lindblom, Nevgi, 2007). The way the pedagogical training courses have been organised at the University of Helsinki is indicative of the continuous training of teachers. The training is organised in cycles, in the first cycle which is usually of short duration, 4-6 months, the aim is to help the teachers to know and use student-centred teaching methods. The first cycle courses are considered core training courses and focus on general theoretical principles of learning and teaching. Once the first cycle is completed, they are given the opportunity to continue in the next annual course, which aims to influence teachers' existing perceptions of their teaching, learning and pedagogical thinking. The second cycle includes a short practicum, in which teachers observe each other in teaching and assessment. While the extremely interesting thing about this practice is that a teacher in the field of pedagogy monitors the teaching of each teacher and provides individual feedback. In the third stage teachers can apply for a two-year programme, during which they take part in a practicum both in their own course and in other institutions, while carrying out research on teaching in higher education. The above practice is not mandatory, a professor may choose to attend only the first cycle and not continue. However, there appears to be a structured system of pedagogical training organised centrally by the Higher Education Research and Development Center (Postaref, Lindblom, Nevgi, 2007).

Another example of the adoption of pedagogical competence of higher education teachers is Sweden. In 1998, the Swedish higher education regulations stipulated that the teaching skills of the prospective lecturer or professor should be given the same weight as scientific training. Although attempts have been made to design University Pedagogy courses since the early 1970s, specific courses began to gain traction in the last decade due to the need to improve the teaching work provided. Additional reasons that contributed to the organisation of the respective courses were the insufficient funding of Higher Education Institutions, the doubling of the student population within a decade without being accompanied by a corresponding increase in state resources. The development of University Pedagogy was an instigation of the Swedish Ministry of Education but the implementation was undertaken by the Universities themselves. The Center for University Pedagogy established at Umea University is a typical example aimed at supporting teachers. Through our browsing on the corresponding website, we see that it is a program that provides support not only to new teachers but also to university professors with more experience. One of the aims of the courses is "practical teaching, which means building bridges between subject knowledge and teaching practice". As pointed out in one of the proposed pedagogical courses, the duration of which depends on the teachers' seniority, "the course recognises that in addition to the knowledge of the subjects and a wide methodological repertoire, a good knowledge of the way in which the students learn the content of the subjects. The course is intended for those who have taught for a few years at university and believe in the power of teaching and the revitalising effect of learning"(<https://www.aurora.umu.se/en/education-and-research/support-for-education/>). Among other things, support is offered on how to supervise postgraduate work, pedagogical leadership courses for those who are already, or will be, pedagogical leaders or something similar, such as, for example, director of studies, program coordinator, course coordinator in a department or in a faculty, while symposia are organised for the exchange of opinions and good teaching practices (<https://www.aurora.umu.se/en/education-and-research/support-for-education/>).

Another example is the University of Stockholm, which hosts the only seat in Sweden in the field of University Pedagogy. The courses started to be offered from the academic year 2013 – 14 and are also aimed at all teachers, experienced and beginners, who wish to improve their teaching skills. The aim of the courses is to design courses based on the principles of learning optimisation and the

experience of colleagues, in the integration of modern information and communication technologies in the curricula, in learning and teaching in higher education, in the teaching of courses, in pedagogical training and supervision of the work at the undergraduate and postgraduate level as well as in the creation of the teacher's pedagogical training portfolio (Gougoulakis and Oikonomou, 2014:31).

5. Conclusion

It becomes clear from the above that the continuous interdisciplinary dialogue around university teaching is important as we are facing an educational environment that favours internationalisation. The interest in higher education is usually focused on students and the skills they need to acquire to meet the needs of the market but no one is interested in who and how will impart them and in what way they will acquire these skills and knowledge. The new branch of University Pedagogy has begun to gain ground in foreign countries and especially in Scandinavia. In this way, higher education teachers are asked to respond to the new challenges that the university is called to face. Until recently, scientific research has been the main prerogative or focus of attention of higher education educators, as the number of publications and peer-citations underpins world university rankings and the attraction of capital, which has been necessary since the downsizing of government funding. Now teaching is also called upon to play its role through the introduction and/or upgrading of good teaching practices which are based either on special pedagogical training programs offered by universities or through the exchange of good practices between teachers.

The university is therefore an institution called upon to respond to new economic, social and technological developments. The issue is how the respective political and educational leadership perceives the role of the university. If the university is seen as an organisation in which both professors and students form a whole and together will contribute to the economic growth and well-being of society, then the pedagogical training of teachers will be seen as a tool of empowerment and necessary in modern challenges. If the university is perceived as a place of iniquity, as a burden on the state budget that must be released from it and referred to private funds and another place where everyone must operate competitively and as broken human units a practical pedagogical training of university students will be rejected, ignoring the fact that at all levels of education, even more so at tertiary level, the educational process does not cease to be a collective, interdisciplinary and multifaceted process.

Notes

1. According to article 54 of Law 4589/2019, an additional formal qualification for filling the vacant positions of teachers and members of Special Educational Staff is pedagogical and teaching competence, which is certified either before the appointment, in accordance with paragraph 4, or after the appointment, through successful attendance of special training programs. Candidates who have certified pedagogic and teaching competence at the end of the deadline for submission of applications for candidacy, are prioritized over candidates who do not have it in the evaluation rankings.

The evaluation questionnaires are completed in accordance with article 5 of Law 3374/2005 by the students voluntarily, anonymously and without warning in the context of the compulsory courses provided during the semester and under the supervision of the Internal Evaluation Teams (OM.EA. .). Questionnaires according to the same article concern the quality and means of research and teaching, the structure and content of studies, student care, administrative services and the logistical infrastructure of the unit or institution. [...] The answers given express the views of the interviewees on the quality of teaching, the best organization of the courses, the cooperation with the teachers and their expectations from the studies.

As defined in articles 17 and 19 of Law 4009/2011 the "Qualifications for the election of professors of all levels", one of the election parameters is the "autonomous educational project" depending on the level, the years of autonomous teaching are also defined, the supervision of Ph.D. theses and other teaching work. However, nowhere is it mentioned not only the possession of a certificate of pedagogical and didactic competence but also the quality of the educational

work, as it is not possible to measure it through the questionnaires as defined by Law 3374/2005. Gougoulakis P. and Oikonomou A. (2014). "University Pedagogy", *Scientific Educational Journal "εκπ@ιδευτικός κύκλος"*, Volume 2, Issue 1, p. 39. https://www.researchgate.net/publication/263464305_Panepistemiakē_Paidagogikē

At this point we must clarify that the Pedagogical Proficiency programs implemented by some universities are not part of the pedagogical training of faculty members. The specific programs are implemented for students or graduates of higher educational institutions who wish to be appointed to secondary education. An example of this is, in addition to ASPAITE, the one-year Studies in Educational Sciences program, which is implemented by the Athens University of Economics and Business (OPA).

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Section B

**Active learning
Student engagement &
Student agency**



6. Role playing and its effects on a first semester computer programming course

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Abstract: This paper reports on our experience of introducing a group project combined with role-playing in a first semester university course, i.e., the Computer Programming Methodology course, offered in a non-computer engineering curriculum, where first year students used to have low participation in the final exams.

Students selected their role among a) Coordinator, b) Analyst, c) Programmer, and d)

Tester. The goal of our experiment was to increase engagement in the course among first year students. The main results showed the positive relationship between role playing and final exam participation. The analysis of the quality of the attributes of the pilot application gave us important information about what the students consider as desired or attractive quality characteristics, as a kind of valuable feedback for instructor, with an additional and quite unexpected attractive attribute regarding the enhancement of academic writing skills.

Keywords: *Role Playing, Project-Based Learning, Engineering Education, Programming courses*

1. Introduction

Computing courses are characterised by complexity and difficulty for many reasons (Byrne and Lyons, 2001). Many of the latter are attributed to the complexity of modern software complemented with the transition from individual programming to team-based software development. Moreover, the students' required effort to understand the theoretical concepts and their relations to user-requirements or the software applications that they use on a day-to-day basis (Stoilescu and Egodawatte, 2010), related to an academic course time-frame of 13 weeks being insufficient (Jenkins, 2002).

For all these reasons, a variety of educational techniques and methods are used in computer science courses, among them role-playing which is well-known for the active engagement of students during the teaching process. Role playing motivates and engages students in real world scenarios and enhances learning. As such, some researchers like Buldu (2022) have incorporated role playing as an extension of dramatic play in a teachers education programme. Also, Vatalis (2017) uses simulations in groups of students for teaching a sustainability course, whereas students change their roles in a cyclical way. The team of academics consisted of Moreno-Guerrero, Rodríguez-Jiménez, Gómez-García and Navas-Parejo (2020) who used role playing along with educational videos to the "Organisation and Management of Educational Centres", a master's degree level course for future teachers of compulsory education. Most importantly, role play as an active learning strategy can be used, not just in face-to-face classes, but also in blended or distance learning (Erturk, 2015).

The work of Díaz Redondo, Vilas Arias and Solla (2012) presents a relevant experience of the educators at the School of Telecommunications Engineering at the University of Vigo (Spain). The academics formulated groups and each student is assigned a typical role in a software development project, i.e. as a project manager or designer or requirement analyst, with promising results. Erturk (2015) presents a role playing strategy that has been applied from 2013 through 2015 at the Eastern Institute of Technology (EIT) in New Zealand, in the "Systems analysis and Design" course. This initiative has involved students in the computing and information technology bachelor's degree programme.

At the same time, several surveys and studies show the low proportion of women in computer science education programs as well as, more generally, in STEM (Software, Technology, Engineering and Mathematics) (e.g. Adam, 2005; Farmer, 2008; Margolis and Fisher, 2003; Directorate-General for Research and Innovation, 2021; Tomassini, 2021). Although most countries have more women than men enrolled in tertiary education, the number of women who choose STEM at university level is around 15% (Chavatzia, 2017). As a consequence of this *gender gap*, the employment of women in the technology sector is also low.

Our initial empirical observations during our teaching experience at an Engineering School, and specifically in the "Computer Programming Methodology" course (1st semester) motivated this study as it showed that the classic formula of two-hour lectures supplemented by two-hour laboratory sessions per week, may not meet expected results. Another observation was the fact that first-year students, especially female students, refrained from participating in the final exam of the course. This realisation prompted us in the academic year 2018-19 to design and offer a pilot group projects initiative, complementary to the lectures and labs. As such, we applied role playing along with group projects (Díaz Redondo, Vilas, Arias and Solla, 2012) as a learning strategy, in which the students assumed distinct roles with the obligation to present at the end of the semester an

integrated project that required a combination of theoretical and laboratory knowledge, but at the same time it simulated the development of an integrated software application which, in addition to knowledge, also required an extra set of skills (i.e. cooperation of team members, preparation of a written report, and, public oral presentation of the project results).

This initiative of the tutors is a step towards integrated and active learning, which suits adults, such as our students, according to Rogers (2010). The methodological approach that we followed is similar to the out-of-class role-playing that other tutors have implemented in IT courses, as illustrated above, however, it contains original elements as it captures the situation before the experiment and then it attempts to interpret qualitative elements of the role-playing process and contribute to the tutor's feedback in relation to the classification of the pilot application characteristics, thereby adding value to current research in the field.

The methodological approach is presented in the second section. The results of the role-playing analysis and the classification of the features of the pilot application are presented in the third section along with conclusions in the final section.

2. Methodological approach

Bearing in mind that the role playing technique had not been applied previously in our course and given our empirical observation of low participation in the final exams, the known difficulty of IT courses, our experience in adult education and our intention to strengthen active participation in our teaching practice, we proposed to the first year students in the 2018-19 academic year to take part, voluntarily, in a group project combined with undertaking distinct roles. The strategy that we followed is broken down into three phases, as shown in Figure 1.

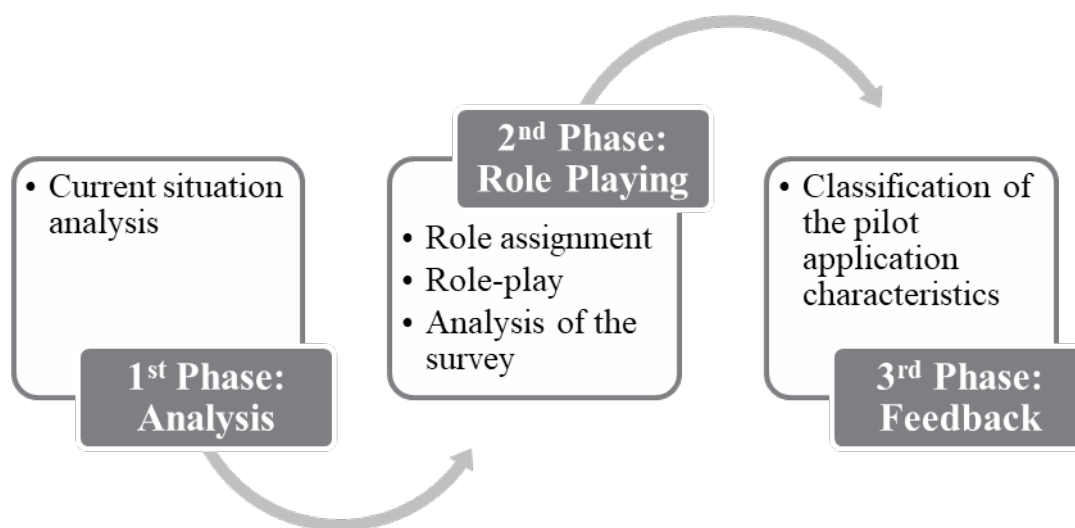


Figure 1. *The methodological approach*

In the first phase, the current situation in relation to the participation in the final exams was analyzed, since there was a suspicion that the first-year students avoided participation by leaving this obligation for the following year(s). Students have this possibility based on the current legal framework, i.e. to be examined in a course in the year that they choose. Subsequently, in the second phase of our strategy, we assigned group projects in combination with roles. The analysis of the

roles assumed by the participants was based on the responses to a questionnaire designed and distributed to the participants (see the appendix). Finally, in the third phase, feedback, the characteristics of the pilot application were analyzed based on the Quality Model of Kano (1984) and the answers to the specially designed second part of the questionnaire.

The pilot implementation of this learning method in the second phase bore several challenges. Firstly, group projects are a well-known educational technique applied in engineering schools of later semesters (Palmer and Hall, 2011). This method was new for the first year students, and it was challenging as they did not know each other very well and were not confident in role selection and team formation. Another challenge was that students did not have enough practice in team working in secondary education level. Furthermore, the assignment of roles nullified the possible intentions of some to not actively participate in the development of the project and therefore to reap the effort of fellow students - members of their group. Finally, the integrated development of a software application created the conditions for strengthening a series of skills that might not have been cultivated to a sufficient degree in secondary education, such as producing a written academic report, which constituted an additional challenge for the participants.

The topics of the projects had as a common theme the creation of a Customer Relationship Management (CRM) system and required the use of a word processor for documenting requirements, a diagram editor for producing Data Flow Diagrams and flowcharts and the Code::Blocks Integrated Development Environment (IDE). The students were trained in the latter during their laboratory sessions. The students were asked to form groups of 4 to 5 people, with the following distinct roles: Coordinator, Analyst, Programmer A, Programmer B and Tester. We assigned two programmer roles on one hand to follow the pair programming technique (see, e.g. Plonka, Sharp, Van der Linden and Dittrich, 2015) and on the other hand to help students be less intimidated of the requirements of this role as they would not be alone in this task. This practice also reflects our experience in real-world application development (see e.g., Spanoudakis and Moraitis, 2022).

To facilitate the work of the groups, at the beginning of the semester, clear instructions on the roles per case were distributed along with a template of the written report where each role had a section to complete. The students knew that at the end of the semester they would have to publicly present their team's project, both to their fellow students and to a group of tutors, deliver the written report and the software they developed. In the end, they would be asked to participate to an anonymous research survey by completing a questionnaire.

For the needs of the survey, we designed a questionnaire, which is listed in the Appendix. The questionnaire is divided into two sections: the first section includes demographic and other information related to the role of each student (questions numbered 1 to 10).

The value of feedback from the tutor to the students and, vice versa, from the students to the tutor has been commented on by many researchers (e.g. Knowles, Holton and Swanson, 2015). In the third phase, in order for the students (who presented the group projects) to provide feedback to the tutor, a group of specially designed questions on the attributes of this pilot application was included in the second section of the questionnaire. The analysis of the characteristics was based on the well-known model of Kano (Kano, 1984; Kano, Seraku, Takahashi and Tsuji, 1996). Kano proposes three levels of quality, as follows:

1. *Attributes of expected quality or must-be characteristics.* The must-be characteristics are considered as basic. If these requirements are not fulfilled, the customer (or student in our case) is completely dissatisfied, while, on the contrary, if they are fulfilled they do not affect satisfaction. For example, when a customer buys a pen, it is implied that it can write. These requirements are obvious, not-expressed and implied. Thus, as these attributes constitute basic expectations, they do not make customers happy; their absence, however, makes customers unhappy or dissatisfied.
2. *One-dimensional attributes of desired quality.* When the one-dimensional attributes are fulfilled, they affect satisfaction in a way that the higher the level of fulfilment, the higher the satisfaction level and vice versa. These attributes are explicitly demanded and constitute what is called “desired quality”.
3. *Attractive attributes.* The attractive attributes have the greatest influence on satisfaction. Fulfilling these requirements leads to increased satisfaction, as in the case of an unexpected fast service in a bank queue. On the contrary, if these requirements are not met, they do not imply dissatisfaction. These characteristics represent the “attractive quality”.

According to the classic Kano model, the classification process takes place through the application of three steps:

- a. All participants in the survey are asked how they would feel if performance on a particular attribute is high and how they would feel if it is low.
- b. The answers to these (double) questions are collected through a qualitative scale (Likert scale) and a cross-table is created with the frequencies of the answers.
- c. The cell of the cross-table with higher frequency is identified and the attribute is classified according to Table 1.

Table 1. *Kano model attributes classification template.*

		Low performance of attribute				
		VS	SS	NN	SD	VD
High performance of attribute	VS			A	A	D
	SS	S	S	I	D	E
	NN	R	R/I	I	I	E
	SD	R	R/I	R/I	S	
	VD	R	R	R	S	

Legend: VS: *Very Satisfied*, SS: *Somewhat Satisfied*, NN: *Neither Satisfied Nor Dissatisfied*, SD: *Somewhat Dissatisfied*, VD: *Very Dissatisfied*, A: *Attractive*, D: *Desired (one-dimensional attribute)*, I: *Indifferent quality*, R: *Reverse quality*, E: *Expected or must-be quality*, S: *Skeptical (re-examine the quality)*.

Thus, section two of the questionnaire examines the quality characteristics of the pilot application. According to the Kano model, participants are asked to answer two questions for each attribute: how they would feel if the performance is high and how they would feel if the performance is low (functional and dysfunctional nature of question). In this sense, and using a 5-point Likert scale, question 11 of the questionnaire is specially designed and includes 11 attributes in three sections, as

follows:

(11.1) *Teaching: 4 attributes (PC operation, C language, flowcharts and Data Flow Diagrams),*
 (11.2) *Tools Usage: 3 attributes (Code::Blocks IDE, Word processor and PowerPoint), and*
 (11.3) *Soft Skills: 4 attributes (collaboration, written documentation, time management, problem solving).*

3. Results of the Pilot Implementation

Existing situation analysis

The detailed data of first year students for three consecutive years as well as the year of the pilot application are presented in Table 2. In the first row we present the totals followed by the values for females and males. Moreover, we present graphically the students' participation in the final exams for all three years in Figure 2, again the total, followed by females and males.

Table 2. *Quantitative data for academic years 2015-16 to 2018-19.*

	2015-16		2016-17		2017-18		2018-19	
	f	%	f	%	f	%	f	%
Students	161	100%	155	100%	167	100%	169	100%
Female students	37	23%	36	23%	36	22%	28	17%
Male students	124	77%	119	77%	131	78%	141	83%
Total students participation to final exams	91	57%	63	41%	42	25%	64	53%
Female students participation to final exams	16	43%	8	22%	8	22%	13	46%
Male students participation to final exams	75	60%	55	46%	34	26%	51	36%

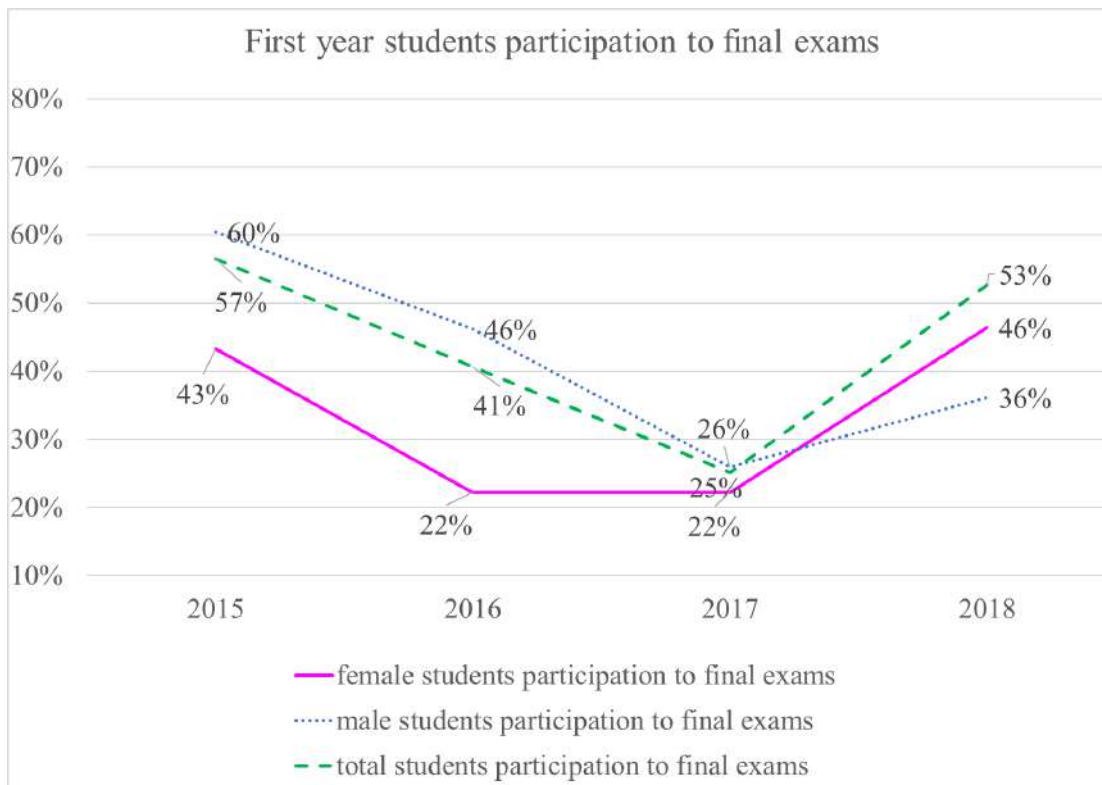


Figure 2. First year students' participation in the final exams for academic years 2015-16 to 2018-19.

An initial finding is that the low percentage of first year female students in the specific engineering school (23%, 23%, 22% and 17%, in the four years) follows the general international trend, i.e. that females are persistently underrepresented in STEM studies (Adam, 2005; Farmer, 2008; Margolis and Fisher, 2003; Directorate-General for Research and Innovation, 2021; Tomassini, 2021).

Regarding the participation of first-year students in the final exams (Table 2, Figure 2), in 2015-16 a total of 57% of the 161 admitted (first year) students participated, while only 43% of the 37 admitted females participated. Accordingly, in year 2016-17, a total of 41% participated, and only 22% of the females. Similarly, in the year 2017-18, a total of 29% participates, and 24% of females. Based on these figures, we observe that the participation of first-year students in the final exams is overall low. Accordingly, females participate less in exams than males except in the pilot implementation year 2018-19, where females participated at a higher rate (46%) than males (36%). Therefore, a first observation is that in the year of the pilot application females have reversed the previous picture of lower participation in exams compared to males.

In particular, for the year 2018-19, the number of students who participated or did not participate in the role playing was checked in relation to the participation or non-participation in the final exams. The results are shown in Table 3 and the Pearson Chi square test showed the following: $X^2(1, N=169) = 18.155, p = .000$ which results that role playing in combination with group projects and participation in final exams are not independent of each other. There is a statistically significant relationship between role playing and final exams participation, i.e. role playing enhanced participation. Despite this, there are still a number of students who participated in the pilot application, who did not attend the final exam (40 people). However, we can claim that role playing was a kind of "motivation for participation". This is confirmed by a number of scholars who focus on the benefits of active learning for improving the learning outcomes and abilities of students/graduates (e.g., Dimitropoulos, 2023).

Table 3. *Cross table.*

		Participation in role playing group project		Total
		Yes	No	
Participation in final exams	Yes	46	18	64
	No	40	65	105
Total		86	83	169

Demographics and student roles in the research survey

In the year 2018-19, 169 students were admitted and from them 18 groups with a total number of 86 students participants were formed. Twenty girls participated in groups out of the 28 admitted to the School, which in principle indicates that most girls chose the specific innovation of the course without apparent hesitation. After the projects were completed, 66 people, or 75% of the participants in the groups, took part in the survey.

Table 4 presents the collected data. The age of all participants was 18 years old and all were studying in the 1st semester. Rows three to seven of Table 4 show the distribution of the roles of the sample, with an interesting observation regarding the most valuable role, that students of the sample have chosen the role of Programmer with a high percentage at 47% and the role of Coordinator with 33.3%.

The significance of the role of Programmers is associated with the development of the project and its final delivery and, thus, constitutes a basic-core role. The high percent for the value of the coordinator role indicates *less obvious* skills of students who have just entered a degree programme, without having any prior experience on how to coordinate their own life away from home, knowing peers, struggling to make new friends, find their feet on the new university environment, managing their own life, etc., the so-called social skills. The schools' insistence on teaching these types of courses during a period of transition of students can only increase the difficulty, as Jenkins (2002) mentions.

Subsequently in Table 4, the answers to the question n. 10, i.e. how confident are the students in their ability to repeat the project without any support from the instructor, show that most students (51.5%) replied on the medium point of the 5 level scale, which corresponds to medium confidence. This result confirms the literature (Jenkins, 2002) for the difficulty and complexity of Programming courses.

Table 4. *Demographics and students' roles.*

		f	%
Gender	Male	56	84.8
	Female	10	15.2
Role	Coordinator	14	21.2
	Analyst	13	19.7
	Programmer A'	13	19.7
	Programmer B'	13	19.7
	Tester	13	19.7
Most Valuable Role	Coordinator	22	33.3
	Analyst	7	10.6
	Programmers (A' and B')	31	47
	Tester	6	9
Confidence for future involvement of students on similar programming projects without support or guidance from the instructor	Not at all confident	1	1.5
	Low confidence	8	12.1
	Medium confidence	34	51.5
	Very confident	15	15
	Absolutely confident	8	12.1
Total		66 students	

An important finding lies in the separate analysis of roles by gender, which showed that no female took the role of Programmer, so this role was taken by the brave (males). This result (see Table 5) is in line with the international reality of the low participation of women in computer science or computer engineering or related specialties.

Table 5. *Role selection by gender.*

		Man	Woman	Total
Team Role	Coordinator	10	4	14
	Analyst	10	3	13
	Programmer A	13	0	13
	Programmer B	13	0	13
	Tester	10	3	13
Total		56	10	66

Pilot application attributes and their classification

For qualitatively studying the 11 attributes of the pilot application, the Kano model was applied. For every attribute a cross table was delivered, like the one presented in Table 6. In the table, the cell with the highest frequency is checked. For example, for the first characteristic (teaching about computers Yes-No) the cross table indicates that most replies (25 replies) exist in the cross tabulation cell of “very dissatisfied” in the absence of the characteristic and “very satisfied” in its presence. Thus, the Kano model for such cases indicates that it is a Desired quality characteristic. In the same way all the characteristics were classified:

- a. *Desired quality characteristics* (one-dimensional characteristics):
 - i. Teaching about Computers
 - ii. Teaching of C Programming Language
 - iii. Teaching of Flowcharts
 - iv. Use of the platform Code::Blocks IDE
 - v. Use of the Word for text processing
 - vi. Use of the PowerPoint for preparing presentations
 - vii. Enhancing Team Working skill
 - viii. Enhancing Time Management skill
 - ix. Enhancing Problem Solving skill
- b. *Indifferent quality characteristics* (neither satisfaction, nor dissatisfaction)
 - i. Teaching the Data Flow Diagrams
- c. *Attractive quality characteristics*
 - i. Enhancing academic writing skill (preparing an academic report for the application)

Table 6. *The teaching for computers cross table*

		Low performance of attribute				
		VS	SS	NN	SD	VD
High performance of attribute	VS	1	0	1	8	25
	SS	1	1	7	14	6
	NN	0	0	0	1	1
	SD	n.r.	n.r.	n.r.	n.r.	n.r.
	VD	n.r.	n.r.	n.r.	n.r.	n.r.

Legend: VS: Very Satisfied, SS: Somewhat Satisfied, NN: Neither Satisfied Nor Dissatisfied, SD: Somewhat Dissatisfied, VD: Very Dissatisfied (n.r.: no replies)

Therefore, most of the attributes are considered as of desired quality. These affect satisfaction of students in an analogous way. The higher the level of fulfilment, the higher the satisfaction level and vice versa. Thus, if the course offers these characteristics, these attributes add additional satisfaction to the students. This result is interesting, among others, because it extends on issues beyond teaching. As such, our students express their requirements on issues of “usage” of various software tools which are not included in the classical offered course, like the usage of the word processor or the PowerPoint tool.

Even though no attempt was made to learn both specific tools, nevertheless the tutor had foreseen from the beginning of the semester and distributed relevant supplementary material with instructions for the preparation of the text of the report and the specifications of the presentation. A basic assumption was that first semester students already possessed these basic IT skills. The “enhancement” of these specific skills, along with soft-skills such as team-working, time management and problem solving are considered as attributes of desired quality of the whole effort.

At the same time, we identified a specific characteristic of attractive quality, which corresponds to the ability of students to write an academic report. As the enhancement of this competence was not expected, it caused delight to our students, and it represents the characteristic of “attractive quality”. [For a systematic effort to improve generic skills through the teaching of university courses see Krassadaki and Matsatsinis, (2012); or through seminars, see Krassadaki, Lakiotaki and Matsatsinis, (2014)].

Finally, the feature of teaching Data Flow Diagrams was included in the category of indifferent quality. This means that teaching this unit of course content contributes neither to student satisfaction, nor to student dissatisfaction, regardless of performance. This information was used in the following years and the Data Flow Diagrams were excluded from the course content.

4. Conclusion

In conclusion, role playing in combination with group projects had positive results. Firstly, low final exams participation was documented and subsequently the positive contribution of the pilot application. The research that we conducted at the end of the experiment had a dual objective, on the one hand to investigate the roles of the students and on the other hand to analyze the quality characteristics of the overall pilot design.

The roles of Programmer and Coordinator emerged as the most valuable roles. Females notably assumed the roles of Coordinator, Analyst and Tester, avoiding the role of Programmer. In addition, a classification was made in terms of quality of the attributes of the pilot application. The later showed that the students consider most attributes as of desirable quality, i.e. those related to teaching, using the software and enhancing skills. One skill-enhancing attribute was classified as of attractive quality (composing written academic texts) and one teaching attribute as of indifferent quality (Data Flow Diagrams). No attributes were classified as of expected (must-be) quality. This type of feedback to the tutor was an unexpected and valuable contribution of this pilot application.

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Appendix. The Questionnaire

Research on role analysis and classification of quality characteristics of role playing

You participated in the educational activities of the course. The goals of the role playing technique introduced this year were for you to gain knowledge, learn to use a programming language, improve your skills and be able to respond to real problems. Please honestly fill in the following, which will be used for research purposes only.

1. Gender: Boy ☐ Girl ☐
2. Age:
3. Semester of Studies:
4. Name of your Group:
5. Role in your Group:
Coordinator ☐ Analyst ☐ Programmer A' ☐
Programmer B' ☐ Tester ☐ (in case of 2 roles, mark both)
6. How many hours did you work for your main role:
7. How many hours did you work for your secondary role (if you had a second role):
8. How do you evaluate your personal contribution to the completion of the Project? (check one circle)

①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
Low									High

9. Which role do you consider the most valuable for such a project?
10. Now that you have completed the project, how confident do you feel about yourself, that is, that you could repeat it without the educator's support/guidance

Absolutely confident	Very confident	Medium confidence	Low confidence	Not at all confident
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	VS	SS	NN	SD	VD
11.1 (A) How would you feel if you hadn't been taught the following					
a. The operation of computers					
b. The C programming language					
c. The Flowcharts					
d. The Data Flow Diagrams					
11.1 (B) How do you feel now that you have been taught the following					
a. The operation of computers					
b. The C programming language					
c. The Flowcharts					
d. The Data Flow Diagrams					
11.2 (A) How would you feel if you hadn't used the following					

a. The Code::Blocks IDE					
b. The word processor					
c. The Power Point application					
11.2 (B) How do you feel now that you have used the following					
a. The Code::Blocks IDE					
b. The word processor					
c. The Power Point application					
11.3 (A) How would you feel if you didn't have the opportunity to improve your following skills					
a. Collaboration in a team					
b. Written documentation					
c. Time management					
d. Problem solving (completed project)					
11.3 (B) How do you feel now that you had the opportunity to improve your following skills					
a. Collaboration in a team					
b. Written documentation					
c. Time management					
d. Problem solving (completed project)					

Legend: *VS: Very Satisfied, SS: Somewhat Satisfied, NN: Neither Satisfied Nor Dissatisfied, SD: Somewhat Dissatisfied, VD: Very Dissatisfied.*



7. Improving student satisfaction, engagement and attainment using asynchronous and blended instruction: Lessons from COVID

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Abstract. The COVID-19 pandemic posed several enormous challenges for ‘business-as-usual’ delivery of teaching and learning at Higher Education Institutions worldwide, but it has also brought along numerous opportunities to reimagine educational delivery and content (see Rapanta et al., 2021) – particularly towards more asynchronous, blended and technologically enhanced learning. While identification of the benefits of this predate the pandemic, namely providing transformational learning opportunities, encouraging greater student autonomy, community building and co-operation as well as skills of active learning, problem solving and self-reflection in a social, technological and collaborative environment

that many learners are now accustomed to (see Biggs, 1999; Capone et al., 2017; McLaughlin et al., 2014; McMahon and Pospisil, 2005; Roehl et al., 2013), the pandemic acted to enforce a fast-tracked transition *into uncharted territory* (see Miller et al., 2021) and towards new hitherto undetermined best practice in the sector. Based on action research conducted prior, during and after the pandemic, the effectiveness of this enforced approach to HE delivery was investigated in this study. Student satisfaction, engagement, attainment and progression levels were analysed at King’s Foundations, a Foundation (pathway feeder) department for International Students aiming to complete UGT and PGT studies at King’s College London. The current study focuses on a content-specific, language and academic skills integrated learning (CLIL - see Airey, 2016; Gao and Cao, 2015; Marsh et al., 2000) module, *Business and Society*, designed specifically for students to enable them to progress and excel on destination programmes located within King’s Business School. Results demonstrate that the ‘pivot’ to a flexible and blended approach has led to improvements in student satisfaction, engagement, attainment and progression rates in both the year of the pandemic and the subsequent one where this approach was adopted and adapted for students returning to campus. Implications for instructional design and institutional policy are discussed.

Keywords. *action research; active learning; digital literacies and technology; faculty development curriculum and materials; student success; synchronous; asynchronous; blended; augmented learning*

1. Introduction

The following paper is written to share my experiences as an educator – module leader – within the context of a London-based university international foundation programme during the 2020 COVID pandemic *pivot* - as the rapid online changes necessitated became known as. The module I was responsible for the design and delivery of, Business and Society, aims to improve international students' academic skills and preparedness for undergraduate study, specifically for Business Studies related degree programmes. The module can be described as employing a combination of English for Academic Purposes (EAP) and Content and Language (and Academic Skills) Integrated Learning (CLIL) in terms of pedagogical traditions, but a more lay person's description could be to say that it is a 'soft' academic subject using business-related content as the vehicle with which to upskill students and better equip them for further study within a UK academic context. The observations, comments and findings here are not to be considered as definitive answers to what the post-pandemic higher education landscape should be re-imagined as, merely to offer personal lived experience as a means to navigate towards best practice for university education. I offer insights, experiences and interpretations based on data driven action research conducted before, during and after the pandemic once universities started contemplating what normal service resumption would look like. It is hoped that this can assist fellow educators regardless of their specific educational contexts with constructing their own post-pandemic university education realities.

1.1 The *pivot* - Key Module Developments: The overarching aim when translating a traditional face-to-face (f2f) module into an online one during the pandemic was to maintain academic standards, student satisfaction, engagement, attainment and progression but also provided an opportunity to make gains in each of these student outcome categories. Table 1 shows the key module developments and brief rationale behind decision made for each.

1.2 Aim of the Current Study: I imagine when outlining the major developments I made for this module that much of this will chime with the experiences of the many others in the same situation as me. I ultimately followed the well-trodden path during the pandemic *pivot* of a live online, blended and/or asynchronous learning approach. However, there remains much variety in how this was realised more specifically. Key questions remain as to what worked well, what did not and what kind of consensus has been reached as to how we now best collectively re-imagine higher education design and delivery. The aim of this paper is therefore to facilitate a move towards a much-needed greater understanding for how we should proceed.

1.3 Research Question: With the pursuit of increased student satisfaction, engagement, attainment and progression in mind, what long-term lessons can be learned from the rapid *pivot* to online and asynchronous teaching necessitated by the COVID pandemic in terms of subsequent academic module design and delivery in higher education?

1.4 Research Objectives:

- To identify how student module satisfaction was affected by the changes outlined above and what the likely causes of this were.
- To examine how student engagement was impacted by these module developments and why might have been.
- To ascertain what happened to student attainment scores after the module changes were made and uncover possible explanations for it.
- To understand what impact this had on student progression and how it can this be explained.
- To develop generalisable (to wider education teaching and learning) suggestions can be made in light of this study's findings.

Table 1. *Key module Developments During the Pivot*

1. Subject matter and pedagogic choices behind this i.e. CLIL-like approach that is content-driven remained very similar for pragmatic reasons – the *pivot* required a large amount of change already and it was deemed unrealistic to make major content-based changes – although number of themes and topics was reduced slightly and the order of contents was altered to help with easing cognitive load - **Increase Inclusivity**.
2. Major changes, however, were seen with the delivery structure. A blended learning approach was adopted involving the majority of teaching and learning hours dedicated to asynchronous delivery with fewer hours earmarked for live teaching (online only in 2020-21; online and f2f in 2021-2). This was enforced in part by social distancing regulation, but also a desire for students to be given more opportunities to engage the module in their own time. Cost cutting with resources needing to be allocated for module adaptation of the nature described here cannot be discounted completely. The traditional structure - one-hour lectures and up to three hours live (seminar) sessions - was on average for the academic year translated into four asynchronous hours and two live hours with a truncated course and frontloading of hours accounting for the additional learning and teaching hours – **Increase Flexibility, Interactivity and Inclusivity**.
3. One-hour traditional lecture content was ‘translated’ into two to three videos of durations varying between five and fifteen minutes. There was a desire to make bite-size asynchronous content to promote engagement with the subject matter and replicate what was perceived to be how students learn from YouTube or similar resources – **Increase Flexibility and Inclusivity**.
4. Lecture videos (now split and shortened) had online asynchronous activities introduced to accompany them that were lead-ins (i.e. sharing opinions and experiences – polls, Padlet, simple discussion boards etc) or follow-ups and extension tasks (i.e. quizzes to test understanding, discussion boards text and video based (e.g. FlipGrid), polls, surveys checking understanding and requests for further clarification etc) – **Increase Interactivity**.
5. The connection between asynchronous work done by students and live sessions was made clear and data generated from online activities (see above) fed into live seminars. When contemplating how the pivot would look for the module I was responsible for, my major desire was to leverage technology to provide personalised and tailored educational provision. In return for larger virtual classes (up to 350 students) which increase efficiencies, I felt it was essential to provide students with input directly helpful to their own specific and emerging needs as failure to do so could affect student satisfaction, engagement and attainment and be in breach of the student-teacher ‘social-contract’ – **Increase Interactivity and Inclusivity**.
6. Create opportunities for personalisation – i.e. to utilise students’ own backgrounds, ethnicities, culture, lived experiences etc – and take opportunities to ‘decolonise the curriculum’ which for me was interpreted as centring the voices of the ‘other’ – particularly (often via case studies) those from the ‘Global South’ and economically marginalised groups. The start of the pandemic coincided with the resurgence of the Black Lives Matter movement and UKHEIs were keen to respond accordingly with statements about removing barriers to academic success based on individual students’ backgrounds - **Increase Inclusivity**.

2. Key Related Literature Overview

There is much written about the pedagogic theory behind much of the typical components witnessed during the pandemic *pivot*, but I wish to focus on three key areas in previous literature relevant to the design and delivery of the module I transformed: a. delivering content-based academic skills development, b. employing blended (including asynchronous delivery), online and technology enhanced (TEL) learning and c. facilitating flexible and inclusive teaching and learning.

2.1 Delivering Content-Based Academic Skills Development

Subject specificity rather than a one size fits all approach is crucial in maximising student buy-in and effectiveness of the educational intervention even for academic skills development (e.g. see Hyland and Hamp-Lyons, 2002); indeed, within the more marketised context, matching what is taught to what is specifically needed at the precise moment in a student's academic journey is also critical (Hyland, 2002). More content specific learning and teaching has been seen in both the contexts of the Content and Language (Academic Skills - in this case) Integrated Learning (CLIL) and with the Contextualising, Embedding and Mapping model (CEM - see Bell and Akdag, 2019; Sloan and Porter, 2010), and these two approaches have in tandem informed the design and delivery of my module. Proponents of CLIL believe that academic skills and language can best be developed with academic content as the vehicle which is organised around coherent themes and that a more content-based thematic approach would lead to greater student engagement and satisfaction. Benefits of this approach have been documented as resulting in a more engaging, natural and authentic context with language development enhanced rather than hindered by the presence of content learning (see Airey, 2016; Gao and Cao, 2015; Marsh, Hau and Kong, 2000). While the focus in the literature has been on language development in less academic settings, this is still highly relevant for my context as a key part of relevant academic skills development is language-based. CLIL is also reported to produce motivated life-long learners who are more familiar with the real world and how best to confident collaborators within it (Suwannoppharat and Chinokul, 2015) – tying in with the module aims of helping students – almost exclusively international and whose first language is not English - to progress and excel on destination programmes located within university's business school) and potentially even the university's core aim to 'make the world a better place'. During the pandemic *pivot*, I made alterations to ensure the content 'vehicle' related to the subject area students would be exposed to in future study – key themes in the business world – and the curriculum was built around ten coherent themes, logically ordered and centred on the impact of business-as-usual practices on societies around the world. My own experiences of designing, developing and delivering is informed by the key pedagogical literature here and prioritises high levels of student satisfaction and engagement with the ultimate goal of increased attainment and progression.

2.2 Employing Blended, Online, Asynchronous and Technology Enhanced Learning

As an experienced educator, I have always been interested in how technological developments can enhance the learner's experience, namely that of flexibility, student learning, engagement and community building. While elements of this had been trialled on the module prior to the pandemic, this was accelerated for academic year 2020-21, and a fully blended learning (BL) and online iteration of the module was developed. I am a strong believer that the student-teacher 'contract' can be upheld better with TEL-informed developments e.g. asynchronous teaching input with learning activities that produces data to be used by the teacher in smaller live classes that are more responsive to emerging student needs. Translating a traditional module into a BL version during the pandemic required the creation of online asynchronous content, and key decisions were made to leverage the benefits of such a delivery approach without suffering from the common pitfalls that may be encountered if not well-designed. BL may be seen as the culmination of the development of technology in education, but much thought is needed to make decisions that reach educators' collective goals in terms of student outcomes. Below, I outline key considerations when making design decisions for the development and delivery of learning and teaching content, and much of what is written were in the forefront of my mind when the pandemic *pivot* task appeared in front of me. It should be noted that BL pre-dates the pandemic by several years, and that I was fortunate enough to have learnt more about it several years prior when I – rather prophetically – re-imagined

(in theory) a traditional f2f module - valuable knowledge when the pandemic forcibly sent everyone hurtling towards a new higher education reality.

BL provides enormous opportunities to generate the specific student outcomes I have already set out as key aspirations for this module. It can improve the delivery and effectiveness of traditional programs (Hall, 2010), encourage contact between staff and learners, student cooperation and active learning (McIntosh, 2004), fulfil potential for transformational learning and provide the opportunity for students to reflect on their own learning 'journey' (Hughes, 2010). Additionally, BL is considered to complement and integrate with traditional live (including f2f) methods (Gillespie et al., 2007) rather than to completely replace it and thus allow for module content to be spread between live and asynchronous delivery components. It is also believed to increase creativity, relevance, accessibility, motivation and a sense of inclusion and collaboration in learning (Gillespie et al., 2007; Allen, 2007). The online component of BL, particularly, leads to new course design and platforms for learning and offers alternative routes to learning. In addition, BL offers collaborative, discussion-led, student-centred and resource-based learning where varied learning styles are catered for (Britain, 1999; Hall, 2010). BL can satisfy the needs and demands for the customisation and personalisation of learning and assessment (Hall, 2001; George-Walker and Keeffe, 2010) – something highly prized in contemporary education. However, there are challenges and key principles to keep in mind. Educational technology is becoming more necessary, but without pedagogic grounding it can become problematic (Chew, Turner and Jones, 2010; Clarke, 2008). Specifically, the understanding of curriculum, design process and relationship between learning technology and theory is crucial (Chew et al., 2010). There is no one size fits all principle, and development of BL courses is time-consuming. It must negotiate difficulties of meeting multiple learner expectations (Allen, 2007), and a transition to a less tutor-led approach to learning where models of learning are more diverse and content is co-constructed with learners (Salmon, 2000). It needs the thoughtful integration and symbiosis of online and live classes and to be planned in a pedagogically sound manner (Chew and Jones, 2010; Deng and Yuen, 2010). There are clearly fundamentally important issues to contemplate here when *pivoting*, and there was very little time in which to do so.

To best complement the BL delivery approach, TEL techniques were employed to better facilitate student engagement, interactivity and deeper understanding were embedded within the module classes and Virtual Learning Environment (VLE) via polls, quizzes and discussion boards for asynchronous lessons. When done in conjunction with BL, they provide transformational learning opportunities encouraging greater student autonomy, community building and co-operation as well as skills of active learning, problem solving and self-reflection in a social, technological and collaborative environment that many learners are now accustomed to (see Biggs, 1999; Capone, Del Sorbo and Fiore., 2017; Hall, 2000; Hughes, 2010; McIntosh, 2004; McLaughlin, Roth, Glatt, Gharkholonarehe, Davidson, Griffin, Esserman, and Mumper, 2014; Pospisil, 2005; Roehl, Reddy and Shannon, 2013). It was therefore hoped that an increase in student satisfaction, engagement and subsequent attainment and progression would be seen as a result of a greater shift towards TEL approaches in tandem with well-designed asynchronous, online and live learning. TEL is integral to the success of BL to create effective, interactive and engaging educational content, but also enables flexibility and inclusivity – more of which is discussed next.

2.3 Facilitating Flexible and Inclusive Teaching and Learning

Inclusive education lies at the heart of the teaching and learning I deliver and design. BL and TEL enable inclusive and flexible learning – students need only an internet connection and a device to access content regardless of their geographical locations and often regardless of the time of day –

some deadlines existed for when asynchronous tasks needed to be completed to prepare for live sessions and facilitate peer contact for student community building. Both BL and TEL also allow for differing learning styles to be catered to, once more providing flexibility and inclusivity. In addition to this, I aim to provide learners with differentiated educational material, an opportunity to personalise learning experiences and content that is more inclusive, reflective, co-constructed and representative of our diverse communities (see Friere, 1996; Walcott, 2021). An example of this is how I have re-imagined the Business and Society module to incorporate more voices and centring the ‘other’s’ perspective within the module – something I realise has become very important to me - closely aligned to HEI values (of ‘decolonising the curriculum’ - creating a more inclusive and anti-racist curriculum). Being of immigrant background and teaching many students from diverse backgrounds including the ‘Global South’, I designed the module with inclusivity of non-Eurocentric voices at the forefront. I was hopeful that this would be received well by my learners. Inclusivity in Higher Education (HE) is essential within a more internationalised context and interventions are needed that facilitate this. I offered learners with numerous opportunities for personalisation to relate their own experiences and contexts to the subject matter in terms of learning activities and for assessment and feedback – again with the goal of enhanced inclusivity and respecting diverse learning communities. Benefits of these approaches are reported to be a more enriched and more transformative staff-student partnership in HE through decolonisation, co-construction and diversifying the curriculum (Friere, 1996; Walcott, 2021) and ultimately an attempt to lessen the Black, Asian and Minority Ethnic (BAME) awarding gap seen in many UKHEIs. Students can engage with module content more effectively and by bringing their lived experiences and assumptions, learners can develop enhanced critical thinking skills. This relates to the ambition that flexibility and particularly inclusivity will increase student satisfaction and engagement in order to create a corresponding upturn in student attainment and progression.

3. Research Methodology

The aim of this paper is to be exploratory rather than confirm pre-existing assumptions and to provide a holistic overview, triangulating from various data sources and stakeholders, to be part of the conversation that imagines what post-pandemic best practice at HEIs would look like. The research outlined below focuses on action research (AR). AR frequently informs my practice in terms of designing, developing and delivering education. Interestingly, the marketised data driven reality UKHEIs find themselves in means that evidence-based practice is essential (see Gibbs, 2010; Gibbs, Cartney, Wilkinson, Parkinson, Cunningham, James-Reynolds, Zoubir, Brown, Barter, Sumner and MacDonald, 2017), and I have used AR to trial and then to design a BL version of Business and Society garnering data from staff and students over a period of several years. Data sources in this study are department-wide and module-specific student surveys, attainment and progression metrics and focus groups involving teaching staff and students. The data provided is therefore quantitative and qualitative in nature. Mixed methods can provide a greater and more in-depth understanding of the phenomenon under investigation here and can add to the robustness of data (Jogulu and Pansiri, 2011). The context of this study demands a research philosophy that captures the subjective opinions of participants involved and as such, a methodology which is underpinned by epistemology - how individuals obtain knowledge and gain a better understanding of what is happening around them (Crotty, 1998) can be seen here to be appropriate. The next consideration is what theoretical perspective to adopt to best capture the experiences of the populations under consideration.

3.1 Study 1: Pilot Online Society Module Delivery (2017-18)

This study used teacher-led class-based focus groups conducted in a live session (seminar) collected in response to a trial done to re-imagine fortnightly content. This was standalone and the rest of the academic year followed a more traditional delivery structure. Many of the components – online bite-sized video input, related interactive tasks and well-linked live session – formed the model of the pandemic *pivot* from 2020 onwards. Students were asked what they saw as the benefits and drawbacks of this approach and whether they would like to see more educational content delivery like this, and teachers compiled responses.

3.2 Study 2: Year 1 Pandemic *Pivot* (2020-21) and Year 2 Pandemic *Pivot* (2021-22)

This investigated student outcomes during the first post-pandemic iteration of the module where all content was online with the majority of which being asynchronous and the second year which contained a slightly higher proportion of live classes than previously and where some f2f classes returned in place of the live online ones. Official student survey data (c300 students per academic year) conducted by the department was complemented by ‘unofficial’ data collection which formed part of the module content – both were numerical and qualitative in nature – and centred on module satisfaction and evaluation of both asynchronous and live components of the module. In ‘unofficial’ surveys, deeper analysis of satisfaction and engagement as well as how well-prepared students felt about their progression to undergraduate study. Official department attainment scores and average progression scores were also examined here. Finally, feedback from teaching staff was sought to provide a more comprehensive picture.

4. Results and Discussion

The following section focuses primarily on the effect of the pandemic *pivot* in terms of student satisfaction, engagement, attainment and progression. However, I wanted to start by including the pilot study conducted two years prior to the pandemic as much of the *pivot* related developments listed above were informed in some part by this.

4.1 Study 1: Pilot Online Society Module Delivery (2017-18)

Converting a fortnight’s worth of module content while keeping the remaining almost ninety percent the same in terms of traditional delivery approach renders observations about overall module outcomes redundant. However, satisfaction and engagement with the fortnight of module content delivered via BL can be intimated based on teacher-led focus group discussions in class. Table 2 below comprises comments made by students and compiled by class teachers – both positive and negative – in response to the pilot blended delivery approach. The distinct points noted by teachers during class-based focus groups (Table 2) could potentially be interpreted as the delivery approach made learning easier, was more convenient and engaging and was often noted as a better experience than a traditional live f2f lecture. Interactivity and flexibility are clearly noted as positives while the opportunity to share opinions and responses ‘publicly’ with other students was – particularly via the medium of video – not universally welcomed. Interestingly, the variety of task types and their connection to the input content was positively received, but an acceptance that this would be more of a load for students than simply attending a one-hour lecture was noted. Indeed, this pilot informed the *pivot* delivery approach and was used as an exemplar for other modules and greater time to complete asynchronous tasks online was built in. Many of the benefits of BL and TEL listed above (see Biggs, 1999; Hall, 2000; Hughes, 2010; McIntosh, 2004; McLaughlin, et al., 2014; Pospisil, 2005) can be seen here, and trialled developments lived on past the pilot.

Table 2. Student Focus Group Comments

Generally positive responses	Generally critical responses
<ul style="list-style-type: none"> • <i>More lectures should be produced like this.</i> • <i>Liked the variety of tasks involved.</i> • <i>Each lecture should be accompanied with tasks.</i> • <i>Videos were more accessible.</i> • <i>Liked the concept.</i> • <i>Exercises and videos were interactive.</i> • <i>Better than the lecture due to the time – self-paced study - can watch them and then return to them later.</i> • <i>Liked the online content – sometimes lectures are too detailed and too long. Hard to watch a full hour of a lecture recording.</i> • <i>Fit all ideas into shorter time [i.e. bitesize].</i> • <i>Liked sharing with other students opinion.</i> • <i>In the lectures, while listening, it is hard to focus on the topic. Your concentration can wane and attention can drift.</i> • <i>The videos [recordings of traditional] of lectures are too long. Students get bored watching them.</i> • <i>The online exercises were liked in general as a way to check understanding.</i> • <i>The exercise was good as it checked understanding.</i> • <i>There was a reason to watch the videos as students knew there would be exercises afterwards.</i> • <i>It helps to understand what to focus on in the videos.</i> • <i>It helps you prepare for seminars.</i> 	<ul style="list-style-type: none"> • <i>Lack of privacy [in terms of student responses].</i> • <i>Didn't like the Flipgrid video activity – self-conscious about recording and being watched by other students.</i> • <i>Shy to post videos.</i> • <i>Completion of all stages takes much longer than attending the actual lecture.</i>

4.2 Study 2: Year 1 Pandemic *Pivot* (2020-21) and Year 2 Pandemic *Pivot* (2021-22)

4.2.1 Student Satisfaction and Engagement

Student satisfaction of the module can most directly be examined when looking at numerical student survey data conducted by the university department – common place at UKHEIs – periodically. Table 3 below illustrates overall academic year module satisfaction scores for my module, Business and Society. It is important to note that the COVID pandemic occurred in 2020 and so there are two years' worth of data prior and after the *pivot*, and this provides a good degree of symmetry. One other thing to note is that when students were asked how satisfied they were with the module, strongly agree and agree constitute the overall satisfaction – I believe this is sector-wide common practice.

Table 3. Student Satisfaction with Business and Society – 2018 to 2022

Academic Year	Overall satisfaction
2018-19	85.3%
2019-20	82.5%
2020-21	93.6%
2021-22	96%

As can be seen above, for the two years after the *pivot*, there is a marked increase in student satisfaction. There are of course many factors at play here and it is important not to take this perhaps crude metric as evidence that all developments were successful and universally popular. However, that there was continued improvement the following year was perhaps an indication that already popular changes were honed and improved upon based on experience and time to reflect. Simply to add context and not to be overly self-congratulatory, satisfaction levels of above 90% are extremely positive within the sector and were department leading at the time. Table 4 below usefully provides more than a snapshot and drills down more deeply into the data for the first year of the pandemic. Once more, a few caveats are needed here. Firstly, surveys are conducted the term after which they refer to. Therefore, the Term 2 Survey reflects the autumn term while the Term 3 one focuses on the spring term. There was no Summer Term (Term 3) teaching input.

Table 4. Student Experience 2020-21

	Term 2 survey			Term 3 survey		
	O n l i n e material supports learning:	O n l i n e material interesting:	Satisfaction with the module:	O n l i n e material supports learning:	O n l i n e material interesting:	Satisfaction with the module:
Strongly agree	52%	44%	41%	70% (+18%)	67% (+23%)	69% (+18%)
Agree	41%	42%	51%	29%	30%	27%
Strongly agree and agree	94%	86%	92%	98%	97%	97%
Overall Change	-	-	-	+4%	+11%	+5%

There is a clear indication of how satisfied students were with the new online components in terms of how well they support learning and how interesting they were. There is of course nothing to compare this with as the delivery structure previously did not include these ingredients. The yearly

average for perceptions of the online material supporting learning were 96% while beliefs that they were interesting were 92% - both again very positive results. As discussed previously, the key difference during the *pivot* was to focus on creating effective, interesting and accessible asynchronous material (i.e. using bite-size video input, interactive tasks to lead-in and follow-on from video input, encouraging students to check their understanding, flag to their teachers any need for clarification and enabling student community building). This focus on prioritised flexibility, inclusivity and interactivity was very well-received. The comparison between the two terms is particularly pertinent here. The first term witnessed centralised support from the university via an education provider in an advisory role. There was a desire to standardise *pivot* developments as, quite rightly, this was a very major transition for most educators to undertake. However, the second term allowed for more freedom and creativity. As someone with some experience and understanding of the pedagogy behind BL, I relished the opportunity to be ‘let off the leash’. As a result, I believe the dramatic increases particularly with the ‘strongly’ agree categories can be evidence of the developments I instigated gaining traction. Scores of almost 100% are indicative of very high levels of student satisfaction in the key aspects of the module especially the asynchronous element and how the BL approach was imagined. I have selected student comments in Table 5 below again not to self-aggrandise, but to provide a more complete picture. Accusations of cherry-picking data aside, I simply wish to explain the various reasons I feel for such high scores.

This corroborates the level of student satisfaction, but there are a number of interesting responses that have emerged here and help to identify what best-practice could look like. There are comments about the inclusive content-based input in terms of the interest level of ‘real-world’ examples, the overall structure and design of the blended iteration of the module, the interactivity of the activities and student sharing and community building. Currently, I have conflated engagement with satisfaction to a certain degree, but if engagement is to refer to how much did students take part in the module, a question in the survey I conducted as part of the module work expected of students may be relevant. I asked the following:

How much of the KEATS [Moodle – VLE] asynchronous work do you usually do each week?

(1 = some; 2 = about half; 3 = most; 4 = (almost) all)

The average score was 3.7 and while the student self-reporting nature on a credited module should be taken with a pinch of salt due to the potential issues that could influence it, it is indicative somewhat of high levels of student engagement with the asynchronous element. Sadly, the VLE used for this module stored data for less than a year and so much was lost before the research was conducted. This would have given a much clearer idea of the time spent by students for each activity and as a whole. Purely anecdotally, my experiences as a seminar leader on this module were in huge contrast before and after the *pivot* with students much better prepared for the live session and not simply encountering the topic for the first time as was often the case. Along these lines, one very important key stakeholder group to consider here is that of the teaching staff on the module, and I have no desire to ignore their valuable insights and input here. Table 6 contains a few selected staff comments about the post-*pivot* module and its potential effect on student satisfaction and engagement.

Table 5. Selected Student Comments – Satisfaction and Engagement

Overall Engagement:

"A really interesting and useful module."

"The lectures are very clear and interesting. Never got bored!"

"it was very interesting, broadened and deepened my knowledge in new real world and current topics"

"This years business and society class was amazing, informative, interesting, intriguing, interactive, and overall very educational"

"entertaining online lectures, the short keats [KCL Moodle] quizzes also helped me revise the material."

Asynchronous and Overall Delivery Structure Design:

"Online materials and presentations were always supportive and easily understood and interesting as well as teams seminars"

"The keats lessons that were made by Jishan were really interesting and good structured."

"I liked how the topic were explained by both teacher and the lectured on KEATS. I feel that all the topic we covered were relevant and interesting."

"I feel like the module was very cohesive and structured. I enjoyed a the asynchronous and live lessons and found them very educational. I think this lesson taught me a lot about understanding the global business context."

"Jishan Uddin structured all the KEATS lessons so good."

"The asynchronous lessons were really educational and easy to follow and live lessons had a really useful debate structure where everyone shared their ideas with examples form their own countries."

"The lectures online made me question my previous opinions on things which is always good"

"I think in term 2 the asynchronous lessons was better than the first one, especially the online videos and the powerpoints the teacher gives us and easy to use"

"Term 2 was extremely interesting each week the topic title peaked my interest and was very fun to explore such topics from all angles"

"I liked the asynchronous and live seminars we had in Term 2. As I mentioned before, all of them were interesting and relevant."

"The materials were equally useful and interesting for both terms, but in the second term there were useful details such as extra links and Sway texts."

"The case studies, extra videos and quizzes were the most useful activities as they helped me see the bigger picture (real word) and ensure that fully understand the topic"

"I really liked various case studies and connect the topics we cover to real life. I also liked padlet as it was interesting to read what people from all over the world think."

"I found the polls were the most interesting since it shows how different people think and it made me contemplate about certain subjects of where I stand in my opinion"

"Its helpful doing activities that ensure that I understand such as quizzes and discussions and it's really interesting linking topics to real world issues such as the rana plaza and Barcelona guy"

"The module was greatly organized very structural and I liked the cohesiveness of the module as a whole"

"I would like to express my deep gratitude to the leader of the module, Jishan Uddin, for the exceptional quality of the presented asynchronous material and, especially, the video lectures."

Content

"I loved how the society module linked topics to current world events - made it very interesting"

"Society Module really opened up different perspectives and was nice to hear people's opinions and debate on topics"

"I have understood many new concepts in a very effective manner, I am very satisfied with the materials taken this year as they were genuinely interesting"

"I thoroughly enjoyed this module as it had extremely detailed information on the topic of business and gave me a good knowledge foundation"

Table 6. Selected Teaching Staff Comments

“The lectures were broken up into appropriate-sized chunks, meaning little was lost and student motivation remained high. There was a good range of activities. The module leader was responsive to suggestions to broaden approaches to the KEATS materials and add more variety.”

“Organisation of Keats lesson were very clearly labelled and organised which made them easy for staff and students to navigate”

“Thought the KEATS lessons were great; good job Jish. Very engaging and a good variety of types of materials.”

Once more, positive comments on the re-imagined design of the module and its potentially beneficial impact on student satisfaction and engagement can be intimated from here. Overall therefore, the above datasets are very encouraging items of evidence to demonstrate that the pandemic *pivot* and developments listed above are highly likely to have had a positive impact on student satisfaction and most likely also student engagement. I believe that the evidence corresponds with much of the literature outlined previously about the benefits of content-based input as the vehicle for academic language and skills development, BL (asynchronous online and live) and TEL utilisation as well as greater inclusivity, flexibility and interactivity built in in terms of producing the positive student outcomes of greater satisfaction and engagement. In accordance with relevant literature above (e.g. Hall, 2000; Hughes, 2010; McIntosh, 2004; McLaughlin et al., 2014), educational course designers may well receive similar gains if the principles and developments they inspired were to be followed.

4.3 Student Attainment and Progression

It is inescapable that probably the most important metric at university for students is their marks. Institutions, departments, programmes, courses and educators are all judged by how well their students perform. With such a radical change in delivery approach and, to a lesser extent, content in the module, it is intriguing and of course a bit anxiety inducing to examine what effect this has had on scores. Table 7 below illustrates the median scores for the module in relation to the departmental average.

Table 7. Student Attainment and Scores for Business and Society and Departmental average

Academic Year	Median scores (%)	Departmental Average (%)
2018-19	67	70
2019-20	69	75
2020-21	69 (-)	73
2021-22	71 (+4)	68

The first observation to make is that Business and Society is traditionally not the highest scoring module for students. There are a number of reasons for this that are perhaps not of particular relevance to this study. However, what is interesting is that the move to a BL delivery approach in collaboration with the developments outlined already not only did not hinder student scores, but actually increased them by an average of 4% in the second year after the *pivot*. Within the context

of making such drastic changes enforced mostly by a global pandemic and corresponding strict legislation making traditional educational delivery impossible and one where changes had to be made rapidly with limited support, this is very encouraging. The 2021-2 marked increase to above the departmental average (74 was highest module median that year) can be seen as evidence of the culmination of perseverance with and fine tuning of the approach so successful in terms of student satisfaction and potentially engagement. As students have noted above, the ability to rewatch bite-size input, do activities online to prepare, check understanding and share opinions and experiences with other students prior to the live session meant that students were more knowledgeable of the subject area and better prepared to apply that knowledge and demonstrate the desired academic and linguistic skills. My department acts as a feeder of (mostly) international students into the wider college and being better prepared for this future study is crucial for all concerned. The first step for this module was to enable students to be at a level where transition and progression to undergraduate study in business-studies related courses could occur. Related to this, Table 8 provides an indication of how many students achieved the typical progression score of 65% or more.

Table 8. *Number of Students Achieving Progression Scores for Business and Society*

Academic Year	Number of Students Achieving Progression Score (65%+)
2018-19	159
2019-20	203
2020-21	213
2021-22	266

While student cohort sizes have increased year-on-year – and this brings about its own challenges when managing a module with an ever-growing cohort – the figure for 2021-2 constitutes approximately 80% of students undertaking the module. While not as clear cut as attainment score increases, it can be said that the developments made to the module to be more flexible, inclusive and interactive (with content-based vehicle and BL delivery) has tended to enable more students to achieve their required progression scores. While the data on progression is a timely reminder that correlation, however, does not always equate to causation, I am confident that the gains described above are in most part down to the developments described to reimagine a traditional academic module. I will now provide some concluding thoughts based on my experiences of adjusting to the pandemic *pivot*. I expect that the following may well strike a chord with fellow educators, but I feel it provides an important framework with which to contemplate a future-proof reimagination of higher education.

5. Concluding Observations and Recommendations

The COVID pandemic in 2020 witnessed an imposed acceleration towards a blended learning and asynchronous delivery of educational content that had previously been taught via a more traditional live and face-to-face approach. COVID necessitated this sudden move – or pandemic *pivot* as it became known as – but the picture is more complex than this. As such, I have made a few observations below which not only informed but also were informed by my experience of leading the *pivot* on my module during the pandemic:

1. Firstly, this global disruption to ‘business-as-usual’ teaching and learning at Higher Education Institutions (HEIs) has facilitated the reimagination of how educational delivery, and such developments (in part at least) are likely to be here to stay (Rapanta, Botturi and Goodyear, 2021) rather than seen as simply a short-term emergency fix.
2. Secondly, these changes can be interpreted as a fast-tracking of previously imagined and proposed developments in pedagogic literature and as such, COVID provided the impetus to bring forward the use of these on a more wholesale basis (Miller, Sellnow and Strawser, 2001) whereas it is likely that more piecemeal trialling would have been the more logical intermediary (now skipped) stage.
3. However, and almost certainly because of the speed of its implementation, a wide variety in how this new delivery structure has been realised is evident within departments, across institutions and even among the entire sector globally. While there are promising signs that this has been well-received by all stakeholders, there remains of course room for improvement. Therefore, there is a genuine opportunity and need to identify until now undetermined – or at least underdetermined – best practice based on a wide consensus of relevant actors in the sector for this now re-imagined post-pandemic reality we find ourselves in – this is the third observation.
4. As for the final observation, and intertwined enormously with the ones that precede it, are the three key contexts within which this *pivot* has occurred.
 - i. The internationalisation and marketisation of higher education (see Gibbs, 2010; Gibbs et al., 2017) that has taken place recently (in UKHEIs at least) is hugely relevant here as there seems to be – from my perspective an educator within an academic department - a movement to find systems and structures to at the very least account more for expenditure and revenue at HEIs, potentially finding economies of scale and other efficiencies all the while attempting to marry student expectations and perceived needs with what educational provision delivers not just in terms of content learnt and skills acquired but also looking ahead to employability and professional skills.
 - ii. A second key context related somewhat to the first is the desire for digital literacy to be embedded within academic study. Technology Enhanced Learning (TEL) has been growing in popularity and widespread usage within education for a number of reasons intimated above already, but one key idea is to replicate the social, collaborative and technological environment that it is believed contemporary students are accustomed to.
 - iii. A final important context is the push towards creating a more inclusive and flexible educational experience I have witnessed. Inclusivity and flexibility may be considered as logical manifestations catering to consumers rather than simply students within a market-based environment now able to enjoy the additional functionality that TEL allows for; however, there is something missing within this description. The COVID pandemic enforced an emergency shift of delivery mode around April 2020, but planning for the following academic year starting in September was also influenced by the re-emergence of the Black Lives Matter movement re-ignited in earnest in June 2020. There was a push to *decolonise the curriculum* seen at many UKHEIs with many

of these institutions releasing public statements and pledging to make their education provision more inclusive for all students regardless of their own personal backgrounds.

Table 9 provides an aspirational description of what successful post-pandemic higher education can look like.

Table 9. *The intended Impact of a Blended Learning Re-Imagined Educational Landscape*

- Improve student satisfaction, engagement, attainment and progression.
- Replace lost live class time with something at least as good but hopefully much better by leveraging technology.
- Create more tailored and responsive educational experiences which corresponds to improved student outcomes.
- Improve quality of teaching experience and allow for teaching development opportunities.
- Prioritise innovation in digital education and diversity and inclusion in education enabling a wider range of students' backgrounds, learning styles and specific learning needs to be equitably catered to.
- Build a community of learners.
- Empower learners to take responsibility for their learning and encourage independence.
- Embrace students as co-creators of the educational experience.
- Facilitate co-construction of decolonised syllabi.
- Provide a learning environment that stimulates curiosity and supports intellectual endeavour.
- Care about learners on an individual basis and design mainstream interventions that remove inequality in learner engagement, retention and success.

I have identified the following priorities for designing, developing and delivering inclusive, flexible and interactive educational provision that leverages technology to meet contemporary student needs and potentially provide a transformational experience. While I am a huge proponent of an inclusive decolonised syllabus and content-driven approach highlighted above in more detail, I will primarily focus here on the BL (and TEL) delivery approach and how to maximise its effectiveness – see Table 10.

Table 10. *Priorities for designing, developing and delivering inclusive, flexible and interactive educational provision*

1 Development and design of materials – from the approach of simple translation of f2f materials into an online format to radically re-imagining content with the new model in mind, there has been a variety of ways this task has been done. How the live element of learning has been factored in also varies. I've found through experience that f2f materials need to be rethought and contain more variety of tasks to keep learners engaged. Considering learning input is important, but so is student output (useful for later stages too). Identifying what is for peer review, self-reflection/evaluation and teacher assessment and the types of outputs – numeric, visual and qualitative – helps me to plan learning content. However, there is good practice and alternative ways of doing this and it would be hugely useful to share good practice and respond to student feedback. Adaptive learning is an area perhaps under-used but something to consider as are ways student responsibility of their learning can be developed.

2 Measuring learning and preparing for live classes – the teacher's role is somewhat re-imagined, and the design needs to take into consideration. Building in the time and space so teachers can potentially look at quick quantitative data – survey about student's own measurement of learning and quiz scores - and one piece of qualitative (written or spoken work) could improve the live session and closely aligned to a student-teacher social contract (large asynchronous classes but with tailored data driven intervention for students on an individual level). Developing best practice here is essential including how teachers should approach this task, how much time should be given to maximise effectiveness and how teachers create live content off the back of asynchronous student learning and output.

3 Delivery of live classes with asynchronous learning in mind – it works well when the live classes focus is factored in when designing the whole programme. I experimented with telling students exactly what live class will contain so that they come prepared specifically for the discussion and group work we will do. This was based on student focus group data and appears to be effective. Responding to emerging student needs is very valuable but more challenging unless the design is thoroughly thought of, and more time is given. To respond to specific student needs, a better, more uniformed (to some extent where appropriate) and properly resourced approach is needed.

4 Ongoing learning – with fewer live classes, it is key to keep students engaged and involved. Building a community of learners who continue to be engaged with educational content before and after live classes would make up for less 'teacher time'. The danger of asynchronous learning is the focus on isolated individual work. It is important to look at how peer study is encouraged before and after live class. I have experimented with students creating personal reflections as blogs that other students can comment on. Bringing together best practice would be very beneficial if the resources to improve the design and structure of the educational provision are provided.

As a final comment, this study aimed to document one educator's experiences with the pandemic *pivot* in the hope that others might benefit from the sharing of it. It is conceded that data sets could be more complete, more rigorous data collection could have been conducted and there is a large bias on behalf of the author in favour of BL and TEL in the re-imagination of education. I hope that future studies can take us closer to the more comprehensive understanding that is required.

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8. Combining collaborative learning and project-based learning in higher education: Does working in teams make a difference?

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Abstract. Nowadays, cultural, political, socio-economic, technological and industry changes demand educational transformation at higher education (Crespí et al., 2022; Korkmaz and Kalayci, 2022), since, in this increasingly complex world of the 21st century students need additional knowledge, skills and competences for personal and professional life (Crespí et al., 2022; Rofik et al., 2022). This requires a change in teaching paradigm, from traditional teacher-centered learning approach to

student-centred learning approach (Crespí et al., 2022). Communication and collaboration are two of the most wanted skills and can be enhanced through project-based learning. However, although academic interest in collaborative learning (Mendo-Lázaro et al., 2018) and project-based learning in higher education (Shpeizer, 2019) has increased during the last decades and have been shown to benefit student learning and engagement, empirical studies are still limited. In this context, the aim of this presentation is to develop a teaching paradigm implemented to undergraduate students of a primary education department, combining collaborative learning with project-based learning. Student teams worked during the semester on small and large projects related to the course content and presented the results of their work in the auditorium. Also, at the end, in addition to the written exams in the course, they handed in a portfolio with all their work and their self-assessment. The learning outcomes, the students' grades, the content of the portfolio and the reflection of students and lecturer on the process, at the end of the semester, showed that this teaching paradigm had a positive effect on students.

Keywords: collaborative learning, project-based learning, higher education, teaching paradigm

1. Introduction

Globalization, the increasing interconnection and communication between people and countries around the world (Crespí et al., 2022), has brought changes in many areas of people's lives and especially in the professional area, within a competitive labor market (Lim, Jawawi, Jaidin, & Roslan, 2023), creating the need for new knowledge and skills necessary for any kind of work and for life in general (Crespí et al., 2022; Lim, et al., 2023). More specifically, cultural, political, socio-economic, technological and industry changes demand educational transformation in higher education (Brewer, Lewis & Ferns, 2022; Crespí et al., 2022; Korkmaz & Kalayci, 2022; Torrijo, Garzón-Roca, Cobos, & Eguibar, 2021) since 21st century students need additional knowledge, skills and competences for personal and professional life (Brewer et al., 2022; Crespí et al., 2022; Guo, Saab, Post, & Admiraal, 2020; Lim, et al., 2023; Rofik et al., 2022; Torrijo, et al., 2021). This transformation calls for a paradigm change in the educational model of higher education (Crespí et al., 2022; Shpeizer, 2019; Torrijo et al., 2021) as it requires educators' re-alignment from traditional teacher-centered learning approaches to student-centered learning approaches (Crespí et al., 2022) in which the needs, interests and learning processes of each student are taken into account (Shpeizer, 2019). In traditional learning approaches, teachers serve as 'transmitters' of knowledge and students are expected to be the passive receiver of what is disseminated (Crespí et al., 2022; Guo et al., 2020; Torrijo et al., 2021) with no motivation and willingness to take part in the teaching and learning process (Crespí et al., 2022; Guo et al., 2020). As a result, students often find it difficult to develop professional and soft skills (Guo et al., 2020; Torrijo et al., 2021), such as problem-solving and teamwork skills (Guo et al., 2020), and they often lack a deep understanding of key knowledge (Guo et al., 2020; Torrijo et al., 2021).

On the contrary, in the context of the student-centered learning approaches, students are at the center of the learning process (Crespí et al., 2022), in which they are intentionally and actively involved (Crespí et al., 2022; Torrijo et al., 2021). Additionally, this learning change also brings about changes in the role of the teachers, who instead of transmitting knowledge, they become role models, mentors and facilitators of the learning process (Crespí et al., 2022; Lim, et al., 2023). One active student-centered learning approach is project-based learning through which, among many others, communication and collaboration, two of the most wanted skills for the 21st century (Alamri, 2021; Crespí et al., 2022; Dhanapañño & Sutheejariyawattana, 2022) can be enhanced (Crespí et al., 2022; Yunus, Setyosari, Utaya & Kuswandi, 2021).

Based on the above, the aim of this paper is to contribute to the transformation of current educational models in higher education through a teaching paradigm. This teaching paradigm is a part of a preliminary study/pilot study implemented to undergraduate students of a primary education department; it combines project-based learning with collaborative learning in order to enhance basic competencies for their academic and professional life as citizens of the 21st century.

2. Literature review

2.1. Project-based learning

Project-based learning is a pedagogical method that supports teachers and students to move away from traditional teacher-centered learning approaches (Lim et al., 2023) and acquire knowledge, skills and competences to deal with the ever-changing and complex world (Rofik et al., 2022). Project-based learning has similar characteristics to other learning methods such as problem-based learning (Guo et al., 2020; Shpeizer, 2019) and inquiry-based learning. However, its key features differentiate it from other learning methods (Shpeizer, 2019).

More specifically, project-based learning is a teaching method that involves students in an inquiry process (Brewer, et al., 2022; Guo et al., 2020; Shpeizer, 2019) in order to answer questions or solve authentic problems related to the real world (Cheng, Chen, Duo, & Wang, 2023; Guo et al., 2020; Shpeizer, 2019). Within this framework students plan their way of working (Brewer, et al., 2022; Cheng et al., 2023), construct and apply knowledge and skills (Shpeizer, 2019), make decisions freely and autonomously (Brewer, et al. al., 2022; Shpeizer, 2019), collaborate (Guo et al., 2020; Shpeizer, 2019) and produce a final product with the aim of presenting it to an audience that has the same interests and concerns as them (Brewer, et al., 2022; Guo et al., 2020; Shpeizer, 2019; Torrijo, et al., 2021). It is argued that this last characteristic of Project-based learning distinguishes it from other learning methods (Guo et al., 2020; Shpeizer, 2019).

Through Project-based learning all students benefit and develop 21st century skills that will be useful in their personal and professional lives (Alamri, 2021; Rofik et al., 2022). Project-based learning supports students emotionally (Alamri, 2021) and enhances their motivation to learn (Shpeizer, 2019; Torrijo, et al., 2021). It develops higher order cognitive skills, such as creative thinking (Rofik et al., 2022) and critical thinking, as well as their ability to solve everyday problems (Lim et al., 2023; Rofik et al., 2022; Torrijo, et al. al., 2021). Also, by engaging in project-based learning activities, students acquire self-regulation (Torrijo, et al., 2021) and become independent thinkers and learners by constructing knowledge through their active participation in collaborative activities with their peers (Lim et al. ., 2023). Finally, it should be mentioned that project-based learning facilitates the development of communication and collaborative skills in higher education (Crespí et al., 2022) even in digital learning environments by utilizing social media in the learning process (Chu, Zhang, Chen, Chan, Lee, Zou, & Lau, 2017).

2.2. Collaborative learning

Active learning and collaborative learning constitute another beneficial teaching method, when combined with project-based learning (Sugianto, 2022; Torrijo et al. al., 2021). The positive effect of collaboration on educational, social and professional level has generated intense research interest in recent decades (Mendo-Lázaro, León-del-Barco, Felipe-Castaño,

Polo-del-Río, & Iglesias-Gallego, 2018). Collaboration and teamwork skills are often necessary qualifications for new jobs, as they increase the productivity of target projects (Lin & You, 2021). Thus, appropriate teaching methods are being sought to strengthen students' collaborative skills (Mendo-Lázaro et al. al., 2018).

In general, collaboration exists when two or more people work together to answer a question or solve a problem or produce a new product (Dhanapañño & Sutheejariyawattana, 2022; Sugianto, 2022). In short, individuals who work together share a common goal whose achievement will benefit both the group and the individuals (Dhanapañño & Sutheejariyawattana, 2022). In this sense, collaborative learning entails the involvement of students in collaborative learning activities to achieve individual and group learning goals, it facilitates knowledge exchange and learning through social interaction, discussion and communication (Mendo-Lázaro et al. al., 2018; Scager, Boonstra, Peeters, Vulperhorst, & Wiegant, 2016; Torrijo et al. al., 2021) .

Working in teams is a collaborative learning approach that is applied and investigated mainly in primary and secondary education, while its utilization and the corresponding research data in higher education are still relatively limited (Mendo-Lázaro, et al., 2018). Teams of students are heterogeneous, i.e. they are composed of students with different personalities, abilities and interests who work together to solve real problems using knowledge that has been taught based on the curriculum, but also using their individual social and communication skills (Crespí et al., 2022). Most university students are not often asked to work in teams, and as a result, they do not communicate or interact effectively, even when they receive appropriate collaborative instruction (Mendo-Lázaro, et al., 2018).

Collaborative learning is effective in print and digital learning environments (Lin & You, 2021). According to research data, it increases students' motivation and interest in the learning process (Torrijo, et al., 2021), strengthens critical thinking, improves communication and collaborative skills, develops problem-solving strategies (Dhanapañño & Sutheejariyawattana, 2022; Sugianto, 2022; Torrijo, et al., 2021) and leads to more positive learning outcomes (Dhanapañño & Sutheejariyawattana, 2022; Torrijo, et al., 2021). Moreover, in most cases, it is more effective than individual work (Lee, Kim, & Byun, 2015; Lin & You, 2021), as it makes individuals more productive by enhancing their creativity (Lin & You, 2021).

Hence, it is necessary to look for teaching methods to develop collaborative learning skills in university students in order to achieve the above goals. According to Scardamalia and Bereiter (2003), one way of fostering collaborative learning skills is to create learning communities (Lee et al., 2015) whose effectiveness depends on the abilities of teachers in higher education. More specifically, the successful implementation of collaborative learning in university classrooms requires careful planning by teachers, interventions throughout the process to deal with conflicts and a meta-analysis of the results of teamwork (Mendo-Lázaro, et al., 2018). Finally,

it should be noted that collaborative learning combined with project-based learning can maximize the above benefits (Torrijo, et al. al., 2021).

3. Study Design

Based on the above theoretical frame, we designed, implemented and evaluated a preliminary study/pilot study combining collaborative learning with project-based learning. The preliminary study/pilot study was implemented to 97 undergraduate students (one study group) of the Department of Primary Education in the University of Crete within the course *Learning and Teaching of the Written Speech* and lasted one semester. Students worked in teams during the semester on small and large projects related to the course content and presented the results of their work in the auditorium.

The effect of this preliminary study/pilot study on students, mainly on their collaborative and communication competences, was assessed through observation, note-taking and educator's and his assistants' research diaries. More specifically, during the course and the tutorials courses, the educator and his/her assistants observed and wrote down the way teams participated, the way they worked and presented their projects, as well as what the students stated when they evaluated their experience and participation in the course both as individuals and as team members.

4. Teaching Paradigm Context

At the beginning of the semester, students were informed about the structure of the course content, the teaching method and their own active participation by working in teams of 3 or 4 students. Afterwards, students created their teams and in each lesson they undertook small projects that a team had to present in one of the following lessons. These projects were about finding the answer to a question that arose, presenting a theoretical learning and teaching approach concerning written speech, creating and presenting educational material that would facilitate the learning and teaching process of the written speech in a specific elementary school grade. When a project arose that required a lot of time to complete, teams optionally undertook to work on it throughout the semester and present it at the end of the semester in the auditorium.

Throughout this process, students' teams had the support and assistance of the master's and doctoral students of the educator in the context of tutoring courses. More specifically, the master's and doctoral students (MDS) guided students' teams (Ss), clarified parts of the lesson that were difficult for them, presented/modeled the way of organizing and handling a project, the stages of completing an inquiry project, as well as the appropriate way of presenting it. They also supported students' teams to face difficulties and participated in the lesson as educators' assistants.

Completing a project students' teams presented it in the auditorium in order to provoke a dialogue with other students and the educator. Through the

dialogue/discussion the teams received feedback, improved and revised parts of the project deemed necessary and added the project to their portfolio.

At the end of the semester there was a discussion between the students, the educator and the master's and doctoral students regarding the course and the teaching and learning process that was implemented. All participants evaluated the collaborative project-based learning, assessed themselves and generally highlighted the positive and negative points they had identified.

5. Teaching method

The teaching method applied in the course and in the above teaching paradigm is cognitive apprenticeship. Cognitive apprenticeship is a student-centered teaching method, which has been used during the last decades in higher education as well (Gaki, 2023). Within this approach students learn through observation, imitation and modeling (Gaki, 2023; Wilkinson, 2022). More specifically, in the context of cognitive apprenticeship educators follow these basic steps (Gaki, 2023; Wilkinson, 2022; Wiss et al., 2018):

- discuss with students in order to find out what they already know (prior knowledge) and make them realize that they need to learn a new knowledge/strategy (cognitive dead ends),
- model the new knowledge/strategy and students observe in order to internalize the processes to successfully complete a cognitive task (modeling),
- support and guide students' teams providing procedural facilities (scaffolding),
- decrease help and support as students internalize the new knowledge/strategy gaining learning autonomy (fading support),
- discuss and reflect with students in order to evaluate the new knowledge/strategy (reflection).

6. Results and Discussion

The results of the preliminary study/pilot study revealed from the content analysis of the data collected with the research tools (observation, note-taking and research diaries) and from the students' assessment in the context of the course which was shaped by the written exams they took, by the portfolio they handed in with all of their projects and by the evaluation of their general participation in the course and in the tutoring courses as well. All the above preliminary datasets indicated that this study/pilot study had a positive effect on students.

More specifically, students who reported in the meetings that they were satisfied with the learning process gradually became more active participants in the course, increased their interest, declared they were happy and satisfied with the learning process and had good grades in the final written exams.

During the meetings these students stated:

[S1]"At first, I was too shy to raise my hand and ask questions in the auditorium. Now I ask what I don't understand and all my questions are answered."

[S2]"Now, there is a dialogue and we all participate. I'm not bored anymore!"

[S3]"It's encouraging when your fellow students applaud you after the presentation of the project!"

[S4]"Many of my questions are solved through the team presentations and I understand the course better."

[S5]"It's only a few times that I do teamwork and I like it, because I know my fellow students better and understand the course"

[S6]"The help we have from the master's and doctoral students is important, because we feel more confident about what we have understood and we feel comfortable when we present our work."

In addition, both the educator and the master's and doctoral students (MDS), pointed out in the meetings that the student teams, especially those that worked without tensions and frictions, were the ones that worked in an organized and methodical fashion during the completion of the projects that met the target criteria in terms of content and structure. Also, MDS students reported that during the presentation of student projects in the auditorium, engaged students were gradually less anxious and more comfortable when answering the questions of their fellow students or the educator, showing that they had understood the content of their assignments and generally the content of the course. Finally, following the teams' progress and their projects, the educator (Edu) as well as MDSs pointed out students' progress and enhancement of basic competences, such as collaboration, communication and critical inquiry learning. Indicative student statement in support of this claim follow:

[S7]"The first time the team meets for a new project, we discuss and everyone undertakes a part of the work. Later we met again in order to synthesize what we found and proceed to the final result."

[S8]"We try to make sure that each one says his opinion about the project and its content, but it's not always easy. Although, we all know that it is necessary to work together and get the project done."

[S9]"The strategies for searching and locating information on the internet, which we learned in the tutorial course, helped us a lot. We know where and how to look for the appropriate information concerning our project."

[S10]"I am no longer anxious about the presentation of the project. I am well aware of the content of our project and the assistant or the educator will intervene if it's needed."

Furthermore, the educator and MDS students wrote down the following statements:

[Edu]"This time the M. wasn't looking at me for confirmation as her team was presenting. She was more relaxed and made eye contact with her audience.", "The E. answered correctly the questions made by her fellow students as soon as the team finished the presentation."

[MDS1]"The C. now participates more in the tutorial course and is more actively involved in the process of the project."

[MDS2]"Team 4 today gathered all the necessary information for their project. It seems that they now know where and how to search on the internet and in the library."

[MDS3]"During our meeting today I understood that team 7 overcame the difficulties they had and now they are working together in harmony."

[MDS4]"The R. keeps the balance in her team. It seems that she has leadership skills and can manage crises and tensions."

In this paper, we presented part of a preliminary study/pilot study of a collaborative project-based learning approach in higher education, which was implemented with undergraduate students of the Department of Primary Education at the University of Crete. The positive effect of this preliminary study/pilot study on students led to the realization that working in teams does make a substantial difference and further implementation in more courses and in diverse learning environments is essential. More specifically, the teacher implemented the same preliminary study/pilot study during the Covid 19 pandemic, where universities were closed and courses were held online. Even in those particular circumstances that disrupted the function of higher education institutions, the collaborative project-based learning approach was embraced by the majority of students and had a positive effect at all levels: cognitive, metacognitive, social and emotional.

The positive effect of this collaborative project-based learning approach presented in this paper is based on preliminary qualitative data gathered during and after the study/pilot study by the educator and his/her assistants, the master's and doctoral students. Although the results of this preliminary study/pilot study are in line with relevant research, it is necessary to confirm that further research and teaching interventions with a control group need to be implemented using pre and post test tools to investigate recurring variables.

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9. Teaching Ancient Greek Language: challenges and good practices based on Active Learning and Adult Education

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Abstract. It is a common finding of the Department of Philology at the University of Crete that teaching ancient languages (i.e. Greek and Latin) presents significant difficulties to students. The causes for this difficulty are multifactorial and varied. Moreover, in recent years, the voices questioning the traditional teacher-centered model at university have been increasing. An alternative proposal to the teacher-centered model offers the student-centred model of teaching, governed by the principles of adult education. For many years the prevailing mentality of the Greek education system was that adult education should be limited to specific

informal education structures. However, this is not true, since adult education offers us tools for active learning. The innovation of this paper lies in the necessity of. The aim of this paper is to highlight some good practices in order to overcome this stereotype, based on active learning and adult education in a creative and constructive way to approach language courses. The agreement on a contract at the first meeting, the use of technology by incorporating quizzes on an almost weekly basis, the setting of realistic and achievable goals, the practising of asynchronous learning by posting a letter of action on a weekly basis and, mainly, the adaptation of teaching techniques, which apply to the student-centred teaching model, were the framework of my approach. The application of the above had as a result a massive student participation and statistically a significantly better performance by the students.

Keywords. *student-centred teaching, active learning, adult education*

1. Introduction

In recent years the voices questioning the traditional teacher-centered model of education at the university have been increasing. This is evident in the seminars and conferences organized for this purpose, but mainly from the evaluations of both the students and the evaluation institutions.

Although there is extensive bibliography concerning the quality of teaching in primary and secondary education, the teaching quality is seldom measured and recognized at universities (Folkert Deinum, 2016). Emphasis was given during the past sixty years on the studies of lecturing (Brown – Atkins, 2002), whereas other approaches were not the subject of many reviews. Ballard (2013) in his thesis offers an extensive overview regarding the multitude of indicators which have been used to measure the quality of higher education institutions. As Brooks (2005) notes, these measures have been generally organized around reputation of an institution or its faculty, faculty research, and student experiences. Ballard (2013) in his study analysed the criteria which were used by 34 universities in order to validate their own quality regarding education; notably, teaching quality was not among them.

Lately, however, bibliography seems to be filled concerning this issue and focus is given to the quality of university teaching. Thus, studies are appearing that delve deeper into this issue and provide valuable data for research. For example, Noben (Noben et al, 2022) points out that the results of 203 observations reveal substantial differences in detected teaching behaviour and that lecturers mostly demonstrated teaching behaviour in the domains classroom climate, efficient organisation, and instruction whereas teaching behaviour relating to the domains activating teaching and teaching learning strategies was observed less frequently, with almost no evidence of behaviour associated with the domain differentiation.

As Folkert Deinum (2016) puts it, the question what is a good university teacher should start with what you want to achieve with university education. If the focus is on preparing students to be creative and critical thinkers, then different teaching approaches are required compared to the present traditional teacher-centered model.

The University of Crete confronted this challenge and has established since 2019 the Tot training course in order to improve the quality of teaching. What started as a project organized by a handful of people, eventually took the form of a well-established teaching and learning center with international dimensions. Inspired by their work I have engaged myself in writing this paper which aims to highlight some good practices, based on active learning and adult education, that have helped both me and the students to approach the language courses in a more creative and constructive way. For many years the prevailing mentality of the Greek education system was that

adult education should be limited to specific informal education structures. However, this is not true, since adult education offers us tools for active learning. The innovation of this paper lies in the necessity of overcoming this stereotype in Greece. I will present my approach in teaching ancient Greek thematology. It is a common finding of the Department of Philology at the University of Crete that teaching ancient languages (i.e. Greek and Latin) presents significant difficulties to students. The causes for this difficulty are multifactorial and varied.

2. The particularity of Greece regarding teaching ancient Greek courses

With reference to the teaching of ancient Greek, I will begin my reflection on a point that differentiates Greece from the rest of the world and has an impact on the way the education system is structured and operates in general.

In Greece there has always been a particularity concerning the language issue. As early as the Hellenistic years, the common language was confronted by the movement of Atticism, and as Kopidakis (1999, 113) notes, "in fact, the anger of the Atticists was not directed against Asianism, which they saw as a shadowy opponent, but against the common language, which they saw as a deadly enemy of the purity of the Greek language".

The issue of this bilingualism plagued the Greek people for centuries and the problem became manifest in all its dimensions after the establishment of the Greek state. The results of this confrontation between the *katharevousa* and the *demotike* are widely known. Moreover, blood was also spilled on the altar of these confrontations, because language is also a carrier of ideological concepts and political beliefs. Even today there are traces of bilingualism in the Greek state: on the one hand the language of the Church and the official administration, scientific terminology and on the other the language of the people. The teaching of ancient Greek is directly involved in the linguistic question and the intense linguistic antiquarianism worked against substantial antiquarianism (Chatzemavroudi, 2007).

All this complex problem affected, in my opinion, the way Greece dealt with the issue of teaching ancient Greek. Even today, the uncertainty of how Greece wishes to manage this heritage is a tangled mess.

It certainly didn't help that the education system at its birth was based on foreign standards and did not spring from the needs of the student population. Also, short-sighted political and partisan conflicts have always hampered the work of enlightened people, if not leading to their disgrace or death. After the restoration of democracy in Greece in 1974, the path of reforms and counter-

reforms was rather piecemeal each time and was not inspired by a far-reaching and coherent vision. Moreover, in recent years of economic, moral and value crisis, pessimism became overwhelming.

These did not leave the field of Higher Education unaffected either. Students are trying to get a degree from a university that probably doesn't interest them, because it wasn't in their first preferences. During their studies they seem to have grown tired of the outdated model teaching traditions and this is shown by the evaluation indicators. So, in our times, more than ever, the bet is to win the students' interest in the educational process.

Precisely due to the changes, the teacher-centered model is now judged not only as obsolete, but ultimately as dysfunctional. Gone are the days when the student meekly endures the teacher's monologue, however charismatic they may be. Although I think that the nature of the student never suited this model, if I remember the remark of Kazantzakis's classmate, who urged the teacher to be quiet so that everyone could hear the bird chirping. It is now necessary to replace the old model with student-centred and inclusive learning. The principles underlying adult education are consistent with the current needs of our students.

3. Background and Principles of Adult Education in Greece

An alternative proposal to the teacher-centered model offers the model of education governed by the principles of adult education.

Regarding the historical development, it is worth mentioning that in Greece the first adult education activities appeared at the end of the 19th century, quite late compared to other European countries. Initially these were activities of educational organizations and then employee training programs were carried out by chambers of commerce or trade unions. The first official institutionalization of adult education by the Greek state was in 1929 with Law 4397 'On elementary education' and the institutionalization of Popular Education. However, the Greek state's interventionist role in this institution was exercised in the 1980s, when the first EEC subsidies were used for the development of public adult education institutions. In the process, especially in the 1990s, there was a fragmentation and dispersion of subsidized programs among a large number of institutions. Over the years, general adult education programs have declined and activities have shifted to continuing vocational training.

It is noteworthy that, unlike in other European countries, in Greek society there has been very limited participation in adult education. This phenomenon was interpreted as a result of four causes. The first reason is that "in Greece, an adult education movement linked to other social movements

has not developed over time and therefore the institution of adult education does not constitute a form inscribed in the collective consciousness" (National Organisation for the Certification of Qualifications and Vocational Guidance, 110). The second reason was considered to be the generally low level of citizen participation in collective actions. The third reason was considered to be the Greek family's attachment to formal studies, since this is the way to achieve social advancement. And finally, the fourth cause was identified as the rather low quality and lack of recognition of non-formal education.

However, Greek society seemed to show a special interest in adult education when the Second Chance Schools were founded. In 2000, the Second Chance School of Peristeri in Athens operated as a pilot for the first time in Greece, and four new schools were subsequently founded: in Acharnes, in Tylisos of the prefecture of Heraklion, in Patras and in Neapoli in Thessaloniki (Vekris – Chondolidou, 2004). The sequel was spectacular. According to the data of the General Secretariat of the Ministry of Education, up to the school year 2013-2014, the number of secondary schools reached 62 and the maximum number of off-site departments reached 31 throughout the country, from which 10,229 adult citizens graduated.

What was the noticeable difference that made the students of Second Chance Schools embrace the school with love and enjoy the educational process?

In these schools a sense of "belonging" and collective consciousness developed, because everyone participated in all the activities. The first weeks are dedicated to getting to know all the participants, trainers and trainees, through specific approach and interaction techniques. Then, time is spent exploring the needs of the trainees.

It is very important to shape the year's material based on their needs and interests, because there is a strong incentive to learn in this way. Also, their particularities are taken into account, both at the individual level and at the level of class dynamics. This is important because the material and teaching is adapted to the appropriate level.

There is no textbook. After completing the time of mutual acquaintance and needs investigation, the trainer shapes the material and sets the goals. Of course, these schools were initially under the supervision of academics specialised in pedagogy and in the most regular meetings the planning of the material and objectives in each literacy was made, as well as the submission of the annual Programming. This lack of textbook gives the teacher the freedom to find material that suits the needs and interests of the learners and thus is attractive to them. In fact, there is a sense of co-formation, since the trainee contributes substantially to the choice of material.

The assessment is only descriptive. What frightened a student in a typical school was the negative and rather dismissive numerical assessment. A 'bad' grade, which was not accompanied by explanations, but simply placed the student in the lower levels. Number boxes that determined the way others saw them and ultimately determined the way they saw themselves. This mode of assessment is completely deconstructed in Second Chance Schools. In each literacy there is extensive reference to the skills developed by the student and the criticism has a constructive meaning, without a negative sign. This kind of assessment prompts the trainee to self-knowledge and finally leads to self-esteem.

A variety of techniques are used in the educational process. Basically, the teacher-centered model is deconstructed with the endless monologue. Easy to say in theory, difficult to do substantially. There are various techniques to carry out such an educational process: discussion, questions – answers, brainstorming, role play, simulation, working groups, case study, etc. Bibliography exists, as long as there is a willingness to see the educational process in a different light. What I found is that the more someone is activated and involved, the more one enjoys the educational process, whether as a teacher or a student. The general philosophy in Second Chance Schools is to promote active participation, to utilize the experiences and experiences of learners and to respect the way everyone learns. Especially the utilization of experience through the obstetric method acts as a catalyst, since it frees the trainee from the previous negative experience with education, leads to active participation and ultimately leads to self-esteem (Rogers, 2007).

When I started working in adult education, I understood that there were distinct boundaries, if not insurmountable walls, between formal/typical education and adult education. I am pleased to see that this is slowly disappearing. Boundaries are becoming fluid and the need for extroversion and ultimately sustainability of schools and universities requires ways to be found to strengthen public education. I do not consider the principles governing adult education to be a panacea if applied in formal schools. There are certainly many difficulties. But a dialogue can be initiated on this basis. Recently, at a conference organized by the Dean of the Faculty of Philosophy of the University of Crete on education, a pilot project that promotes interpretive dialogue in formal school, based on the principles of adult education, was presented with very good results. This program is applied in specific Lyceums, in school material. What changes is the way of approaching the material and the role of the teacher. It is not the authority who monologues and offers ready-made solutions and chewed food, but the inspirer, the mediator between the student and the text. It inspires questions and sometimes guides interpretive paths, letting children unfold their thoughts

and reach their own conclusions. It is worthwhile for all of us to take a fresh look at the purpose and way our education system works for the sake of future generations.

4. Some good practices in teaching ancient Greek language

These principles formed the pillars of my approach in teaching ancient Greek language at the University of Crete. Moreover, the graduates of the University have in their luggage a variety of knowledge of many cognitive subjects. However, there is also within it the prefabricated model of teacher-centered teaching. This is how they were taught; this is how they will teach. It takes a lot of internal effort and maturation for a teacher to be able to interact participatively with the class. Especially in adult education this, when it happens, is magical, because there is meaningful communication and knowledge sharing. This creates a participatory perception and encourages active learning.

According to the description of the course, the general aim of this course is to familiarize students with the ancient Greek language and more particularly to enable students a) to improve their skills in reading Attic Greek prose texts, b) to broaden their knowledge of grammar, syntax and vocabulary and c) to practice translation from ancient Greek to Modern Greek. More specifically, after the completion of this course, students should be able to:

- Know and use the basic tools for the study of the ancient Greek language (dictionaries, grammars etc.)
 - Know and use the basic terms used for the description of the phonological, grammatical and syntactical structures of ancient Greek
 - Apply the rules regarding accents and spirits of Ancient Greek and accentuate Greek texts
 - Recognize and analyze basic morpho-syntactical structures of an Attic Greek prose text (seen or unseen)
 - Understand the meaning of standard words and recurrent terms used in Attic prose texts
- Translate unseen texts (simple or average) from Ancient Greek into Modern Greek

The content of the course has a tripartite structure, which corresponds to the three basic fields of study of the ancient Greek Language. It includes:

A) Texts of ancient Greek prose writers (reading and understanding of the texts, translation into Modern Greek; texts read may include authors such as Thucydides, Plato, Isocrates, Xenophon, Demosthenes and Plutarch)

B) Review of basic grammatical phenomena of Attic Greek (accentuation, verbs, nouns etc.)

C) Review of basic syntactical phenomena of Attic Greek (clauses, infinitives, participles, indirect speech etc.)

The summative assessment consists of a final three-hour written exam which includes:

I. spelling exercises (dictating, accentuation)

II. grammar and syntax exercises

III. translation of an appropriate passage of ancient Greek (Attic)

Reading the general objectives of the course and knowing the level of knowledge of the students, one immediately understands the discrepancy that exists. This course is mainly aimed at first-year students and is compulsory for students in the three departments of the Faculty of Philosophy. However, very few first-year students manage to pass the exam, making it the most oversubscribed course in the Faculty of Philosophy. What is the reason for this?

It is a purely linguistic course and students have great difficulty in learning ancient Greek. In general, there is a great linguistic deficit in the use of Modern Greek, as well as in the production of written language in general. The scores have dropped a lot and while in the past excellent students used to study Philology, now students are admitted via the panhellenic exams with grades of 8 and 9 in language courses (on a scale of 20).

Most importantly, with the existing university admission system, many students enroll in the School of Philosophy without this being a conscious choice and without being interested in the specific studies. They just want to get a degree to get a job and to feel accepted by their social environment. But when the passion for the subject you are called upon to study is missing, how constructive can these studies be?

To deal with these difficulties I applied the principles of adult education, having in mind that learning to reach adults is a matter of increasing your understanding not only of your subject but of yourself and of the learning group and in this way you improve your practices (Rogers – Horrocks, 2010).

First of all, it was very important to create a climate of trust, security and acceptance. It is very difficult in a large auditorium for students to feel comfortable enough to express their point of view. The first lesson is really important and the lecturer has to discuss with the students in order to set mutual boundaries and build a climate of acceptance and safety. The lecturer must explain that everyone can express themselves without fear of irony, insult or rejection.

The lecturer should not ask for a response from a student by pointing a finger, but should wait for them to indicate their participation in the question. Even the way questions are phrased should be such that it prompts the student to think critically.

In terms of cognitive objectives, the first lesson should be exploratory. I usually ask each student to write down what they find difficult in ancient Greek and where they would like the instructor to Emphasise. This way I get initial feedback on my students' level of knowledge and can set realistic goals. The syllabus is broken down into specific objectives on a weekly basis. This gave the students the feeling that they were involved in structuring the course, with objectives that met their needs. As Hattie (Hattie, 2009) notes, experienced experts possess pedagogical content knowledge that is more flexibly and innovatively employed in instruction and they understand at a deeper level the reasons for individual student success and failure on any given academic task; their understanding of students is such that they are more able to provide developmentally appropriate learning tasks that engage, challenge and even intrigue students, without boring or overwhelming them.

The use of the e-learn platform was very helpful in three ways:

1. I posted a note after each lesson in which I wrote down what I had done. This way students who could not attend the class in person did not lose contact with the class and organized their study.
2. posted the text, translation and supporting material of the module.
3. I make a weekly quiz reviewing the unit they had learned. So, they could check their progress themselves.

In order to ensure uninterrupted and abundant attendance of students (it is common in the University in the middle of the semester to have a low attendance of students in classes) it was very important to use appropriate teaching techniques. When the student feels that they are actively participating then their interest is not diminished and they are not distracted. The worst thing a lecturer can do is boring monologue with tedious recitation of theoretical information.

Appropriately formulated questions are very helpful in helping students to participate. The brainstorming, discussion, and use of experiential knowledge energize students. All of this creates a sense of co-construction of the objectives and syllabus, that it is worthwhile to attend the course and ultimately creates a sense of belonging, which is so important for the student's integration into the university community.

Van de Grift (van de Grift, 2014), who has observed and measured teaching quality in large representative samples from Flanders (Belgium), Lower Saxony (Germany), the Slovak Republic, and The Netherlands, reveals that measures of creating a safe and stimulating climate, clear and activating instruction, and teaching learning strategies were reliable and fully or at least partially scalar equivalent across these countries.

In concluding, the agreement on a contract at the first meeting, the use of technology by incorporating quizzes on an almost weekly basis, the setting of realistic and achievable goals, the practising of asynchronous learning by posting a letter of action on a weekly basis and, mainly, the adaptation of teaching techniques, which apply to the student-centred teaching model, were the framework of my approach.

The application of the above had as a result a massive student participation and statistically a significantly better final assessment and improvement of their cognitive level.

Many challenges and changes lie ahead, especially with the rapid development of artificial intelligence. In modern education our focus should be in diversity, inclusivity, equity (Katsampoxaki-Hodgetts, 2020). Our students deserve a good education system that will give them the skills and the optimism to live a good life. After all, a state that is not based on education is building on sand, according to Adamantios Koraes.

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10. Differentiation practices at the Writing Center of School of Philosophy

Abstract. The traditional lecture-style teaching method has been criticised as potentially leading students to failure, while differentiation has been seen as a crucial factor in determining academic success for many students.

Despite this, the implementation of pedagogical differentiation in higher education remains underexplored. To address this gap in research, the current paper aims to contribute to the understanding of inclusive pedagogy in tertiary education in Greece. It focuses

on presenting the application of Differentiated Instruction (DI) practices within the Writing Center at the School of Philosophy, University of Crete. Utilizing the Universal Design for Learning (UDL) model, the paper will illustrate specific examples of how DI practices at the Writing Center promote inclusiveness by accommodating the diverse needs of all students.

Keywords. *differentiated instruction, writing, inclusive strategies, Universal Design for Learning (UDL)*

1. Introduction

1.1 Definitions and theoretical framework: Inclusive pedagogy

In the context of inclusive teaching practices, the term *modification of instruction* usually serves as a broad umbrella, encompassing a wide range of adjustments applied within differentiated or individualised educational settings (Lindner & Schwab, 2020). These adaptations aim to cater to the diverse needs of students, promoting an inclusive learning environment. However, the term *inclusive teaching* seems to lack a commonly shared meaning in the literature, while at the same time doubts may arise regarding whether *inclusive pedagogies* truly signifies something distinct or whether it merely refers to effective and general teaching practices (Lindner & Schwab, 2020). According to Lindner & Schwab's comprehensive review of 17 articles spanning from 2008 to 2018, inclusive education exhibits distinct characteristics, which are as follows: collaboration and co-teaching, grouping, modification (of assessment, content, extent, instruction, learning environment, material, process, product, and time frame), individual motivation and feedback, as well as personnel support for students (Lindner & Schwab, 2020).

Considering all the above, in the present paper, inclusive pedagogy refers to how “teachers practice educational inclusion by supporting all students in their classrooms by mindfully employing instructional approaches that are advantageous to all learners and foster a sense of community” (Florian, 2014 cited in Livingston-Galloway et al., 2021).

1.2 Differentiated Instruction

Differentiated Instruction (DI) involves the instructional approach of tailoring teaching methods to offer learners a variety of learning options based on their individual needs. According to Tomlinson (2017) and Chamberlin and Powers, (2010), DI involves the following features (Table 1):

Table 1. *Elements of DI*

Chamberlin & Powers, (2010)	Tomlinson (2017)
<ol style="list-style-type: none">1. ongoing assessment2. acceptance of students' differences3. respectful work4. collaboration5. group work6. proactivity7. materials accommodating students' needs	<ol style="list-style-type: none">a. contentb. processc. product

More specifically:

1. In the context of Differentiated Instruction (DI), it is essential to establish a connection between the curriculum, instructional methods, and assessment. This connection empowers teachers to customise their teaching approaches according to the unique needs of their students. Teachers proactively employ diverse methods such as conversations, discussions, evaluating student work, observations, and formal assessments to gain insights into their students, using this information to create personalised instruction. In a differentiated classroom, assessment goes beyond the conclusion of a unit; it commences with diagnostic pre-assessment to understand individual needs and interests through students' learning profiles. Throughout the unit, continuous assessment of students' readiness levels, interests, and learning approaches informs the design of tailored learning experiences. Different forms of final assessments are utilised to

ensure that each student effectively demonstrates their learning over the duration of the unit (Tomlinson, 2017; Chamberlin & Powers, 2010).

2. In differentiated classrooms, teachers adjust their methods to accommodate the unique variations among students, meeting them at their current level of understanding while expecting them to achieve their full potential. They achieve this by creating engaging and meaningful learning experiences that cater to each student's preferences and diverse abilities. The main goal is to offer suitable and challenging learning opportunities to all students. Additionally, teachers focus on fostering student agency, independent thinking, self-responsibility, and a sense of accomplishment in the learning journey. Such classrooms actively involve students in decision-making, fostering personal growth and preparing them for success in the present and future (Tomlinson, 2017; Chamberlin & Powers, 2010).
3. Every student is encouraged to engage in respectful work and is presented with challenges that are achievable through lessons focused on critical thinking, fostering individual development. Incorrectly, some teachers believe that differentiated instruction involves giving different amounts of work to students based on their perceived abilities. However, such approaches are typically ineffective since simply adjusting the quantity of work is unlikely to address students' needs effectively. Genuine differentiation entails tailoring the nature of the tasks to align with each student's unique needs and capabilities (Tomlinson, 2017; Chamberlin & Powers, 2010), such as when using graded materials.
4. In a differentiated classroom, the teaching approach flourishes in its dynamic and collaborative nature, creating a mutually beneficial learning experience for both teachers and students. Despite their expertise, teachers are consistently motivated to explore the most effective ways their students learn. Through active collaboration with students, teachers fine-tune learning opportunities to meet individual needs. The main focus remains on continually assessing the fit between learners and the course material, making necessary adjustments as needed. The greatest strength of differentiated instruction lies in its adaptability, recognizing that not every match between learners and assignments will be perfect, while continuously striving to improve learning experiences beyond a one-size-fits-all approach (Tomlinson, 2017; Chamberlin & Powers, 2010).
5. Teachers display adaptability in utilizing both group work and whole class discussions within the classroom. They create diverse groups of students, taking into account their readiness, interests, and learning profiles. Group work is seamlessly integrated with whole class discussions and activities, fostering a comprehensive learning experience. For instance, there are occasions when whole-class instruction proves effective and efficient in establishing common understandings and promoting shared discussion, ultimately building a sense of community. The instructional pattern can be likened to mirror images of a wavy line, where students begin as a whole group for a study, then transition to small groups or individual learning. Subsequently, they reconvene to share their findings and plan further investigations before dispersing again to undertake more work. This cyclical process continues, with students regularly joining together to share, review, and collaborate throughout their learning journey (Tomlinson, 2017; Chamberlin & Powers, 2010).
6. The approach to differentiated instruction is proactive versus reactive. In a differentiated classroom, the teacher anticipates and accommodates the diverse needs of learners by planning lessons that offer multiple avenues for learning and expression rather than adjusting instruction when the lesson does not work for some students. This approach aims to engage and challenge

all students effectively. On the other hand, in a one-size-fits-all approach, the teacher makes reactive adjustments when a lesson fails to work for certain students (Tomlinson, 2017; Chamberlin and Powers, 2010).

7. According to Chamberlin and Powers (2010), the implementation of space, time, and materials should be tailored to accommodate the diverse needs of learners. In addition, Tomlinson (2017) recognises three core curricular components which teachers should differentiate: (1) content, which refers to what students learn; (2) process, representing how students make sense of ideas and information; and (3) product, which entails how students showcase their learning.

In addition, Tomlinson (2017) recognises three core curricular components which teachers should differentiate: (a) content, which refers to what students learn; (b) process, representing how students make sense of ideas and information; and (c) product, which entails how students showcase their learning.

1.3 Universal Design for Learning

The concept of inclusive pedagogy has been associated with diverse theoretical frameworks thus far, while at its core lies the crucial idea of how recognising differences can be viewed as a method of acknowledging each person's uniqueness and not as stigmatisation (Stentiford & Koutsouris, 2021). In their systematic scoping review, Stentiford & Koutsouris (2021) observed a prominent distinction between approaches that prioritise commonality and those that accentuate individuality, revealing a tension between inclusive pedagogies which emphasise what is “common to all” and “making difference invisible”, which is often associated with stigma, and the ones which highlight “differentiation” and “individuality principles”.

Universal Design for learning (UDL) stands as an instance of approach that prioritises commonality. The fundamental tenet of Universal Design (UD) is that educators should strive to meet the needs of all students in regular classrooms without requiring additional support. This can be achieved through appropriate differentiation in general teaching, encompassing various means of engagement (the 'why' of learning), representation (the 'what' of learning) and expression (the 'how' of learning), and to accommodate diverse student requirements (Stentiford & Koutsouris, 2021) with the aim to create “expert learners who are purposeful and motivated, resourceful and knowledgeable, and strategic and goal-directed ” (CAST, 2018b). The Three Principles (“why”, “what”, “how”), which are based on neuroscience research, guide UDL and provide the underlying framework for the UDL Guidelines (CAST, 2011).

The noticeable conceptual similarity between Universal Design for Learning (UDL) and Differentiated Instruction (DI) has resulted in a growing number of diverse interpretations regarding the interrelationship between the two in the literature (Griful-Freixenet et al., 2020). Griful-Freixenet et al. (2020) present three different categories of interrelationship between UDL and DI 1) The complementarity interrelationship between UDL and DI 2) The embedded interrelationship of DI within UDL, and 3) The distinctive/ incompatible interrelationship between UDL and DI.

In the present paper, DI is perceived as specific practices being part of UDL. This means that DI is a practice for differentiating the curriculum while UDL serves as the theoretical model by following its main 3 principles:

- *Principle I: Provide Multiple Means of Engagement (why)*
- *Principle II: Provide Multiple Means of Representation (what)*

- *Principle III: Provide Multiple Means of Action and Expression (how)*

2. Methodology

In the following sections, the DI practices (i.e., strategies, activities, tasks) implemented in the Writing Centre are grouped under the three general principles of UDL (see section 1.3). Furthermore, the specific DI practices are linked to the 7 core principles adopted by Chamberlin & Powers (2010) and the 3 areas suggested by Tomlinson (2017), as presented in section 1.2 (Table 1).

Table 2. *Criteria of grouping DI in the Writing Centre*

Each of the Writing Centre's practices presented in the following sections will be highlighted with three indicators as follows:

- P.I / P.II / P.III indicating one of UDL principles
- p.1 / p.2 / p.3 / p.4 / p.5 / p.6 / p.7 indicating Chamberlin & Powers' core principles
- letter *a*, *b*, or *c* indicating Tomlinson's areas

UDL Principle I (P.I)	UDL Principle II (P.II)	UDL Principle III (P.III)	Chamberlin & Powers, (2010)		Tomlinson (2017) a. content b. process c. product
			1. ongoing assessment (p.1)		
			2. acceptance of students' differences (p.2)		
			3. respectful work (p.3)		
			4. collaboration (p.4)		
			5. group work (p.5)		
			6. proactivity (p.6)		
			7. materials accommodating students' needs (p.7)		

For example, if a practice is indexed as *P.I, p.2, b*, it means that multiple means of engagement are provided (*P.I: UDL principle 1*) by accepting students' differences (*p.2: core principle 2*) via process differentiation (*b*).

3. DI examples in the Writing Centre

The Writing Centre of the Faculty of Philosophy was established in October 2019 with the aim of helping students studying at the University of Crete to understand and produce both written and spoken academic language through the establishment of educational environments that foster engaging teaching and learning methodologies rooted in the concepts of inclusive education. Thus, it employs DI strategies, activities and tasks which will be presented in detail in the following sections.

1. Principle I: Provide Multiple Means of Engagement

According to UDL Principle I “affect represents a crucial element to learning, and learners differ markedly in the ways in which they can be engaged or motivated to learn. There are a variety of sources that can influence individual variation in affect including neurology, culture, personal relevance, subjectivity, and background knowledge, along with a variety of other factors presented in these guidelines. Some learners are highly engaged by spontaneity and novelty while others are disengaged, even frightened, by those aspects, preferring strict routine. Some learners might like to work alone, while others prefer to work with their peers. In reality, there is not one means of engagement that will be optimal for all learners in all contexts; providing multiple options for engagement is essential” (CAST, 2011). This means that teachers should know the learners’ profile so that they can diagnose students’ interests.

Writing Centre practice 1: P.I, p.1, b

In the Writing Centre, learning profiles are known by distributing questionnaires before the start of the lessons at the beginning of every semester including questions about the students’ preferred way of learning (e.g., face to face or online, reading texts or watching videos, etc.).

Writing Centre practice 2: P.I, p.7, c

Interest differentiation of content involves including in the curriculum ideas and materials that build on current student interests or extend student interests (Tomlinson, 2001: 73).

In the Writing Centre, lessons are designed according to the students’ interests which were identified in the final evaluation form filled in by the students at the end of each semester.

Writing Centre practice 3: P.I, p.6, c

“Based on assessment of student understanding, the teacher may reteach a part of her students, find another way of teaching a group of students, or meet with yet another group to extend their understanding and skill.” (Tomlinson, 2001: 76). “Minilessons or miniworkshops on particular product skills such as taking notes in research, conducting interviews, drawing conclusions, editing, and so on, can be quite effective in targeting content to students’ readiness, interests, or learning profile. Many students will benefit from this kind of focused instruction—not just those who struggle academically” (Tomlinson, 2017: 153). Finally, it is important to “provide differentiated mentors (i.e., teachers/tutors who use different approaches)” (CAST, 2011).

In the Writing Centre, there are mini-lessons provided according to the students’ interests, acting proactively, so that the students acquire skills useful for their studies, such as taking notes in research or using presentation software.

Writing Centre practice 4: P.I, p.4 / 5, a

According to Tomlinson (2017: 131) creating groups of shared interests can benefit students. More specifically, is suggested that “teachers can make content of varying complexity levels more accessible to the students by using a variety of support systems, such as study buddies, reading partners, audio and video recorders, and peer and adult mentors. These strategies can help many students stretch their capacities as learners....All learners—not just those who are struggling—benefit from time with others who can answer questions about shared interests, sharpen their thinking, or give them access to advanced research skills....Teachers can create extensive support

systems by using the people and technologies in classroom, school, and community, thus giving everyone a chance to reach higher, learn more, and contribute to one another's learning."

In the Writing Centre, there are more advanced students acting as mentors engaged both in class during the lessons and out of the class, providing support to students that need it.

Writing Centre practice 5: P.I, p.2/3/6/7, c

"Providing a model of self-regulatory skills is not sufficient for most learners. They will need sustained apprenticeships that include scaffolding. Reminders, models, checklists, and so forth can assist learners in choosing and trying an adaptive strategy for managing and directing their emotional responses to external events (e.g., strategies for coping with anxiety-producing social settings or for reducing task-irrelevant distracters) or internal events (e.g., strategies for decreasing rumination on depressive or anxiety-producing ideation). Such scaffolds should provide sufficient alternatives to meet the challenge of individual differences in the kinds of strategies that might be successful and the independence with which they can be applied.

Implementation Examples:

- Provide differentiated models, scaffolds and feedback for:
 - *Managing frustration*
 - *Seeking external emotional support*
 - *Developing internal controls and coping skills*
 - *Appropriately handling subject specific phobias and judgments of "natural" aptitude (e.g., "how can I improve on the areas I am struggling in?" rather than "I am not good at math")*
 - *Use real life situations or simulations to demonstrate coping skills" (CAST, 2011: 33)*

Furthermore, "teachers should decide on the scaffolding for student success, such as rubrics/criteria for success, planning/goal-setting templates, timelines, stress planning and check-in dates, as needed to match students' levels of independence. Timelines can also be used to ensure that students actually use the entire block of time allotted to the project (rather than waiting three weeks and five days into a month-long product span before beginning to work on the product)" (Tomlinson, 2017: 148-149).

In the Writing Centre, scaffolding is provided by various means. More specifically, students can reach teacher and peer mentors by using different modes, such as online or face to face in the university, in and out of class, to discuss topics relevant to how they can manage exam or general performance stress. Also, students practice their academic skills in real life situations, since they use their own or their peers' academic materials (e.g., past academic essays) to practice relevant academic skills. Checklists and timelines are used extensively throughout the semester lessons and are reminded to students so that they can check their progress. Also, the Writing Center cooperates with the Students' Advisory Centre of University of Crete and provides experiential workshops on developing skills to manage studying time so that exam anxiety is effectively regulated.

2. UDL Principle II: Provide Multiple Means of Representation

Principle II stresses the need for diverse presentation methods to accommodate different learners' preferences and abilities. This principle recognises that individuals have unique ways of perceiving and understanding information, necessitating alternative approaches for effective learning. Utilizing various representations, like visuals, audio, and touch, enhances knowledge transfer by fostering connections between concept (CAST, 2011). It is also important to provide differentiated feedback (e.g., feedback that is accessible because it can be customised to individual learners) (CAST, 2011).

Writing Centre practice 6: P.II, p.2/7, a

“Some students, even of older ages, find it very difficult to read text or listen to a lecture and come away with a coherent sense of what it was all about. For such students, it can be quite useful to work with a visual organiser that follows the flow of ideas from the text or lecture. Not only might such organisers help them focus on key ideas and information, but they may also help some learners see how a teacher or author develops a line of thought” (Tomlinson, 2001: 77). Also, different forms of final assessments should be utilised to ensure that each student effectively demonstrates their learning over the duration of the unit (Tomlinson, 2017; Chamberlin & Powers, 2010).

In the Writing Centre, lessons are provided with the aid of *eLearn* online class where a visual organiser with the main points of the lesson or the course is always available. Also, there are alternative ways of giving feedback, such as videos, graphs, highlighting and margin notes on the student's paper.

Writing Centre practice 7: P.II, p.2/7, a

“Differentiation of content implies ensuring that a student has a way of *coming at* materials and ideas that match his preferred way of learning. For instance, some students may handle a lecture best if the teacher uses overhead transparencies as well as talk—linking visual and auditory learning. Some students will comprehend reading far better if they can read aloud—whereas other students need silence when they read. Reading the science text may be just the ticket to help one student understand the concept of *work*, while another student may grasp the idea better by watching a demonstration that uses exemplars of *work* and *not work*.” (Tomlinson, 2001: 73).

In the Writing Centre, lessons are provided both synchronously and asynchronously to accommodate students' needs relevant to the mode of delivery. Also, the online content is available in both video and pdf format to complement the face to face delivery. Finally, videos provided in class are always projected along with the subtitles, especially if they are not in Greek.

Writing Centre practice 8: P.II, p.2/3/6/7, a

Using Varied Text and Resource Materials Grade-level texts are often far too simple for some students in a given class, and yet too complex for others. Using multiple texts and combining them with a wide variety of other supplementary materials increases your chances for reaching all your students with content that is meaningful to them as individuals. You can develop valuable differentiation resources by building a classroom library from discarded texts of various levels (or requesting that textbook money be used to buy three classroom sets of different books rather than one copy of a single text for everyone), and by collecting magazines, newsletters, brochures, and other print materials (Tomlinson, 2001: 75). Furthermore, the teacher should differentiate the degree of difficulty or complexity within which core activities can be completed (CAST, 2011).

In the Writing Centre, we are designing for the next semester mini online self-paced asynchronous courses with graded materials (e.g., in academic writing skills regarding accuracy) to complement the regular semester courses.

Writing Centre practice 9: P.II, p.2/4/5, c

“Help struggling learners analyse models of effective products from prior years to hone their sense of the product’s key components, build the language skills necessary to talk and think about the product’s elements, and give them concrete illustrations of what good work looks like. Any student models you share should be a bit aspirational but not out of range. You want to *teach up*, not *discourage*” (Tomlinson, 2017: 154).

In the Writing Centre, students are presented with good samples which they analyse collaboratively in class. After analysing the samples, students decide on specific assessment criteria, and rubrics are created for future use and self-assessment.

3. Principle III: Provide Multiple Means of Action and Expression

“Learners differ in the ways that they can navigate a learning environment and express what they know. For example, individuals with significant movement impairments (e.g., cerebral palsy), those who struggle with strategic and organisational abilities (executive function disorders), those who have language barriers, and so forth approach learning tasks very differently. Some may be able to express themselves well in written text but not speech, and vice versa. It should also be recognised that action and expression require a great deal of strategy, practice, and organisation, and this is another area in which learners can differ. In reality, there is not one means of action and expression that will be optimal for all learners; providing options for action and expression is essential” (CAST, 2011: 22).

Writing Centre practice 10: P.III, p.3/4/5, a/b

“Differentiated instruction is so powerful because it focuses on concepts and principles instead of predominantly on facts. Teachers who differentiate instruction offer minimal drill and practice of facts (as these practices tend to create little meaning or power for future learning); they focus instead on essential and meaningful understandings to create transferable learning power” (Tomlinson, 2001: 74).

In the Writing Centre, all courses aim at students’ acquiring transferrable skills, such as studying skills, academic writing or speaking skills etc. Therefore, alternative ways of product creation are employed, such as cooperative controversy (in which students argue both sides of an issue), graphic organisers, mind-mapping or flowcharts, note-takers etc. (Tomlinson, 2001: 80).

Regarding note taking organisers, however, “the students who read independently may find it restrictive to have to use such organisers. The point is always to provide individual learners with a support system that helps the student grow—not one that feels like an impediment” (Tomlinson, 2001: 77).

In the Writing Centre, note-taking organisers are used during the lessons. Also, the students are familiarised with various note-taking methods that they can implement in their academic lessons. However, there is a continuous discussion throughout the semester of how useful and effective the specific methods are for the students, indicating that these are to be adopted only if they are not restrictive.

Writing Centre practice 11: P.III, p.1/3/4/5, b

“Flexible rather than fixed grouping allows better differentiation and multiple roles, as well as providing opportunities to learn how to work most effectively with others. Options should be provided in how learners build and utilize these important skills. Some implementation examples are:

- Create cooperative learning groups with clear goals, roles, and responsibilities.
- Encourage and support opportunities for peer interactions and supports (e.g., peer-tutors).
- Create expectations for group work (e.g., rubrics, norms, etc.)” (CAST, 2011)

In the Writing Centre, group work is promoted during the lesson both in face-to-face class and online. Group and pair activities are carried out with clear goals presented in rubrics (e.g., assessment criteria).

Writing Centre practice 12: P.III, p.6, c

“There is a tendency in educational contexts to focus on traditional tools rather than contemporary ones. This tendency has several liabilities: 1) it does not prepare learners for their future; 2) it limits the range of content and teaching methods that can be implemented; 3) it restricts learners’ ability to express knowledge about content (assessment); and, most importantly, 4) it constricts the kinds of learners who can be successful. Current media tools provide a more flexible and accessible toolkit with which learners can more successfully take part in their learning and articulate what they know. Unless a lesson is focused on learning to use a specific tool, curricula should allow many alternatives. Like any craftsman, learners should learn to use tools that are an optimal match between their abilities and the demands of the task, such as spellcheckers, grammar checkers, word prediction software, etc.”(CAST, 2018c). Therefore, “students’ should use varied modes of expression, materials, and technologies” (Tomlinson, 2017: 149).

In the Writing Centre, students are guided and encouraged to use varied modes technologies, such as writing and proofing software, plagiarism checkers, online corpora, reference online tools etc.

Writing Centre practice 13: P.III, p.1/5/6, c

“It cannot be assumed that learners will set appropriate goals to guide their work, but the answer should not be to provide goals for students. Such a short-term remedy does little to develop new skills or strategies in any learner. It is therefore important that learners develop the skill of effective goal setting. The UDL framework embeds graduated scaffolds for learning to set personal goals that are both challenging and realistic. Scaffolding tasks as the following can help students develop the skill to set their own aims:

- *Models or examples of the process and product of goal setting*
- *Guides and checklists for scaffolding goal-setting*
- *Differentiated models of self-assessment strategies (e.g., role- playing, video reviews, peer feedback)” (CAST, 2018a)*

Also, regarding assessment, “process, effort, and improvement in meeting standards is emphasised as alternatives to external evaluation and competition” (CAST, 2011). Furthermore, “formative (during the project) and summative (after the project) peer and self-evaluation should be used based on the agreed-upon criteria for content and production” (Tomlinson, 2017:151).

In the Writing Centre, assessment is ongoing, before any course starts with the learner's profile (i.e., learning profile questionnaire), during the course with the design of assessment rubrics and the implementation of self- or peer-assessment checklists, quizzes and text editing/proofing tasks after having been modelled, and at the end of the course, with self-reflection questions on student's own progress (i.e., exit questionnaire).

4. Conclusion

The exemplified practices in the Writing Centre of School of Philosophy at University of Crete (Table 3) demonstrate differentiated teaching practices in accordance with the principles of an inclusive education paradigm.

Table 3. *DI practices in the Writing Centre of Philosophy School at University of Crete*

P.I Practices 1-5	p.1	Practice 1	<i>a. Practice 4</i>
	p.2	Practice 5	
	p.3	Practice 5	<i>b. Practice 1</i>
	p.4	Practice 4	
	p.5	Practice 4	<i>c. Practices 2, 3, 5</i>
	p.6	Practices 3, 5	
	p.7	Practices 2, 5	
P.II Practices 6-9	p.2	Practices 6, 7, 8, 9	<i>a. Practices 6, 7, 8</i>
	p.3	Practice 8	
	p.4	Practice 9	
	p.5	Practice 9	<i>c. Practice 9</i>
	p.6	Practice 8	
	p. 7	Practices 6, 7, 8	
P.III Practices 10-13	p.1	Practices 11, 13	<i>a. Practice 10</i>
	p. 3	Practices 10, 11	
	p.4	Practices 10, 11	<i>b. Practices 10, 11</i>
	p.5	Practices 10, 11, 13	
	p.6	Practices 12, 13	<i>c. Practices 12, 13</i>

Notes

- i. *CAST is a nonprofit education research and development organization that created the Universal Design for Learning framework and UDL Guidelines, now used the world over to make learning more inclusive. (CAST, 2023)*

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11. Designing the "Museum Education" Subject at the University of Crete: towards a more collaborative environment of learning

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Abstract. Designing a university course is an ongoing process of in-depth planning, reflection, and revision, during which students and professors learn one from each other in a collaborative learning environment. Both in universities and museums we focus on more inclusive learner centered learning strategies. This paper illustrates the potentialities but also the limitations of designing and implementing course and seminar meetings within the "Museum Education" subject in the Department of Preschool Education at the University of Crete, during the academic years 2022-2023. Moving from a "pedagogy of compliance" to a "pedagogy of voice", it is crucial to record students' voices upon course and seminar contents,

usefulness, and the implemented learning methods but also their ideas of improvements. In this context an empirical ongoing action research project is conducted based on the mixed methodology with main tools the students' feedback exercises during the semester and a questionnaire, uploaded to the course's E-class platform, to be completed optionally by the students at the end of the semester and the evaluation formal forms of University's Quality Assurance Unit. First interpretation of the data reveals that students need to be heard and they love learning through practice in collaborative environment. The stereotypes about museums emerge and are overturned through the meetings. Students consider the course of Museum Education essential for their studies and underline their need for more experiential learning and training in non-formal learning environments, such as museums.

Keywords: *Museum education subject, Higher education, collaborative learning environment, pedagogy of voice*

1. Introduction

Designing a university course is an ongoing process of in-depth planning, reflection, and revision, during which students and professors learn from each other in a collaborative learning environment (Karalis, 2020· Kerdaka 2020). Both in universities (formal learning environments) and museums (informal and non-formal learning environments) we refer to learning and not educating, focusing more on the procedures and on inclusive learner centred rather than content-based design (Katsampoxaki-Hodgetts, 2022). The sense of belonging and the co-construction of meaning and knowledge, moving from the "pedagogy of compliance" to the "pedagogy of voice" are at the heart of the learning outcomes (Safir, 2023). In addition, changes are happening in the institutions themselves, both in museums and universities. Notions such as inclusiveness, decolonization of knowledge and at the same time the development of artificial intelligence as well as the need for sustainability and green policy against climate crisis are radically influencing the functions of museums and universities.

According to ICOM (2022) new museum definition: "museum is a not-profit, permanent institution in the service of society that researches, collects, conserves, interprets and exhibits tangible and intangible heritage. Open to the public accessible and inclusive, museums foster diversity and sustainability. They operate and communicate... and with the participation of communities, offering varied experiences for education, enjoyment, reflection, and knowledge sharing". In parallel, based on UNESCO (2023), Higher Education is a rich cultural and scientific asset which enables personal development and promotes economic, technological, and social change. UNESCO works with countries to ensure all students have equal opportunities to access and complete good quality higher education. The aim is to offer a fruitful context in which future generations can cultivate their critical thinking, their creativity, their synergies, and of course their cultural, environmental and citizenship consciousness.

The present study illustrates the potentialities but also the limitations of designing and implementing the subject of "Museum Education" in the Department of Preschool

Education at the University of Crete, taking into consideration students' voices during the academic years of 2022-2023.

2. The Theoretical Background

In Greece the pedagogical and didactic issues are usually treated as being of secondary importance and that quality assessment in Higher Education is mainly based on the quantity of research and not on the quality of teaching (Gougoulakis, Kedraka, Oikonomou, Anastasiadis, 2020). The evaluation of the teaching is organized by each University's Quality Assurance Unit, but these evaluations are not considered at all during the election or the promotion of a lecturer in Higher Education. This results in the fact that the teaching from the chair is almost the only applied method of teaching, most of the teachers in Higher Education are not informed about new, more student-centered teaching methods, thus they focus more on their research profile (Kedraka, 2023).

At the same time according to the National Higher Education Authority (ETHAAE) only around fifty percent of students admitted to university get a degree, while the student population remains among the largest in Europe (Lakasas, 2021). It is true that many students are forced by the families to enter university and then they cannot complete their studies. According to research conducted at the University of Patras (Androulakis, Georgiou, Kiprianos, Nikolaou and Stamelos, 2022) the main agent increasing the student's tendency to quit their studies are the following: student's frustration, absence from their obligatory academic duties, dissatisfaction with the subject and the level of studies, incomplete notes and study from lectures and a reduced sense of commitment to the university department. On the contrary, the factors that emerged to decrease students' tendency to drop out are the sense of effectiveness in their studies, the feeling that valuable things are gained from studying, the existence of good relationships with fellow students and university teachers, the interest in the material of the course and the lack of feeling pressure during their daily work.

As claimed by Apostolis Dimitropoulos (2023) former officer of Ministry of Education an important role can also be played by the renewal of teaching methods in

the direction of "active learning", with modern teaching tools and workshops, electronic resources, and books, and with the support of the newly established Teaching and Learning Centres of the Universities. Moreover, university attendance plummeted in the post covid period and has been observed that the number of students is decreased even in the seminar class, where the presence is obligatory and that mainly towards the end of the spring semester the students start to work at hotels or restaurants in towns which are popular holiday destinations like Rethymno.

Taking into consideration all the above results of research, and mainly aiming to help students to reverse factors that may lead them to quit their studies, it is crucial to record students' voices (Millard, 2023) upon the implementation of a University course or seminar, its content, its usefulness, the learning methods but also their ideas of improvements (similar research: Mollaoğlu, 2022· Pavlou, 2022· Argyropoulou, 2021· Karadeniz, Zekiye, 2017· Sotiropoulou-Zorbala, Trouli, Linardakis 2015). In this context an empirical ongoing action research project on designing and implementing course and seminar within the subject of Museum Education was started back in 2021 and is continuing. In this paper we are going to present results, related to the academic year 2022-2023.

3.The designing of courses and seminars within the Museum Education Subject

The subject of "Museum Education" was introduced to the Department of Preschool Education in the spring semester of 2018. The title "Museum Education" rather than "Museum Learning" may depict the idea of linear transmission of the knowledge from the teacher to the students. However even from the first semesters of teaching this subject I felt as instructor this need to be more a part of the team rather than the leader because teaching and learning in this area is more productive when it done cooperatively.

Throughout course and seminar meetings we are trying to transform students' conceptual understanding of disciplinary knowledge of museums, museum learning and the pedagogy of museum focused on preschool education. We help students reflect on relations between theory and practice in "Museum Education" and at the same time to challenge them to rethink their prejudices about museums. Usually, in the museum students feel a sense of intimidation because they believe they do not belong

or they do not know enough about museums (McCullough, Pio, 2023). We first dismantle those beliefs and empower our students to feel welcomed and to cultivate this sense of belonging. When working with pre-service teachers one of the most important things we do as lecturers and museum educators is to promote a sense of autonomy that allows them to familiarise themselves with museums. We strive to model ways of engagement with the museum objects or spaces and promote "close looking" and "inquiry-based learning" that students may apply to their future teaching both in the classroom and at the museum. We should help students through experiencing learning activities to transform the museum into a familiar and comfortable environment, first for them and then for their futures preschoolers.

The first research on the effectiveness of teaching methods within the "Museum Education" subject was conducted in May 2021 (Trouli, 2021). At this time due to the Covid period, the closure of museums and universities led to the reorganisation of the module program, considering remote learning. Web-based museums was the key to effective education in this context (Collins, 2021). Greek museums offered a variety of Museum learning experiences online in the context of distance education. We experienced many of these educational activities, during the online course and seminar meetings. The first results of this preliminary report were the positive enthusiasm about the online Greek museum sites and activities. The students realised the great potentialities of these online tools. They also pointed out that they had the opportunity to learn about Greek museums even at a distance. However, they highlighted the unique experiences which are offered during a visit to a museum in situ, mainly because of the authenticity of the space and the objects. Most of the students were looking forward to the re-opening of the museums and expressed the desire to start visiting physical museums more often.

In the academic year 2022-2023 we have returned to our pre-covid everyday routine at universities and in the museums. During this period, the course "Introduction to Museum Education" (EPA135) (219 enrolled students) and the Seminar "Getting to know the Greek Museum" (SEM145) (20 enrolled students) were offered in the autumn semester and the new course "Child, Public Space and Monuments" (EPA138) (280 enrolled students) and the Seminar "Designing Museum

Educational Programs for Preschoolers" (SEM 146) (20 enrolled students) were offered during the spring semester. The teaching methodology for courses and seminars is based in constructivist theory, on the learning by doing methodology and field trips. The attendance on courses is not obligatory, while seminar attendance is mandatory. However, seminar students have got the right to three absences. Usually the majority take advantage of this right.

The general syllabus of the course "Introduction to Museum Education" is the following divided in 13 weeks (meetings): 1. Get to know each other and presentation of the course, sharing of learning outcomes, and explanation of the assessment tools. 2. Definitions related to Museum Education. 3. Museum Education in Greece. Short history through case studies. 4. Pedagogical theories implemented in museums. 5. Museum, visitors, non-visitors, accessibilities. 6 Museum and formal preschool education (legislative context, organization of a museum visit) 7-8. Decodifying the museums. Introduction to Museum Education Methodologies (1. Narrative method, 2. Socratic method, 3 Discovery method and 4. Experiential and Creative methods) 9 Museum educational activities for preschoolers through case studies and best practices. 10. Artful and visible thinking routines in kindergarten through experiential activities, organization of two field trips at a weekend that students choose. 11. Virtual museums in preschool context 12 Assessment tools of museum learning experiences 13. Revision of the studying material for the exams and students' feedback for the course. The syllabus for the course "Child, Public Space and Monuments", is similar with an emphasis on the notions of public space and cultural heritage taking as an example the old town of Rethymno. We explain from our first meeting the evaluation form of the course. Usually, the evaluation comprises a three-hour written examination. Students should complete 10 multiple choice questions and then they must choose 2 out of 4 questions of development.

The syllabus of the winter seminar is the following: 1. Get to know each other activities, description of teaching program and sharing of learning outcomes. 2. Definition of museum and discussion about pedagogical theories implemented in museums. 3. Preschoolers in museums (legislative context and best practices), discussion of selection of museum and programming of oral presentations. 4.

Structure of an academic essay and bibliography issues. Each student chooses a Greek museum, presents its educational policy, and selects an educational program designed and offered by the museum educators about preschoolers. Afterwards, the student describes the organisation of a school visit 5-12. Oral presentations of students' individual work in front of peers, implementation of an experiential activity related to the chosen program and discussion. 13. Discussion of students' questions on their individual essays before their submission. The syllabus of the spring seminar is similar. The only difference is that students school design their own educational program for a hypothetical preschool class. Four elements are necessary constituents of the successful seminar work: a. study of a specified science topic, b. oral presentation c. write and submit an essay and d. stand for a viva voce in front of the tutor after submission (Undergraduate studies regulation, 2018-2019). Seminar students may attend the field trips organised for course students.

From the first meeting of both the course and the seminar students are informed about the assignments and assessment method at the end of the semester. Moreover, every course meeting is divided into two parts, balancing the theoretical and the practical aspects of the subject. The theoretical part is based on lectures, Ppt slides, reviewing case studies and discussion, the practical part is devoted to experiential activities in groups or in person. The students who are in classrooms and take part in these assignments are recorded and at the end of semester they can have 0.5 of 1 grade more in their final assessment grade.

Additionally further material for the course and seminar has been uploaded to an e-class platform in the context of asynchronous e-learning. Towards the end of semesters, we also upload questions and answers related to the content of the two courses and two chapters of a book as studying material for the exams. At the same time office hours are announced for meeting with the students if they have this need. The aim of courses and seminars within the "Museum Education" subject is to help students get acquainted with museum learning, its methods and its importance and be prepared to organise a museum visit for their pupils in the kindergarten, select the best museum activity for them or even design an educational program for them.

During the first meetings, usually we get to know each other with ice-breaking activities in groups and we are trying to create a comfortable atmosphere through stress management exercises and to cultivate the sense of belonging. We underline that the courses and the seminars are inclusive, that in this model the lecturer is more a coordinator of learning procedure than a teacher, open to suggestions related to the content and the teaching methods. It is crucial from the first meeting that students feel welcomed and comfortable. I always report in every first meeting the words of my PHD supervisor, Bilie Vemi, that a teacher is at the same time a script writer, a director, and an actor. We should be exposed as teachers. The aim activities of role playing and experiential activities throughout all the meetings are to cultivate the above roles, since many of them are usually anxious about designing learning activities for preschoolers and their self-exposure in front of peers or in the kindergarten classroom.

Additionally, we write down, students and me, our expectations, and our needs, and we keep that in a time-capsule, which we open at the last meeting to find out if our expectations were or were not fulfilled. The words they use reveal the stereotypes they have concerning their role as future educators. They should learn about museums, gain knowledge that they are going to pass on to their own students. Rarely do they talk about living learning experiences.

At every meeting we try to reveal the previous experiences and thoughts about the under-discussion notion using the "brainstorm activity" or the "Think, Pair, Share Activity". For instance, before giving the definition of museum we ask students to give their own definitions, using "1-2-4-ALL activity" (person, group of 2, group of 4, all the group). We connect theory with practice, implementing activities related to museum learning methods, such as observation of artworks with "Artful Thinking routines" and role-playing activities. Furthermore, we take into consideration the kindergarten's curriculum to connect the necessary teaching modules with museums, artworks, tangible, intangible cultural or natural heritage. During the last course and seminar meetings after having discussed students' questions, we reflect on the teaching procedure implementing the "rose (positive)-bud (potential)-thorn (negative)" evaluation activity.

To summarise both course and seminar within the subject of Museum Education have got a linear structure of content elaboration, however the teaching strategies are more fluid and interactive to adapt to students interests and everyday life.

4. Research Questions, methodology and limitations

From one semester to another, even from one meeting to another the course and seminar content changes slightly to adjust to the needs of students. Among the research questions that emerges in every semester, and that are part of our research agenda are the following:

1. What are students' attendance habits, and what are the reasons they did not attend the course or the seminar and their feelings?
2. What are students' reflections on course and the seminar design and implementation?
3. What are their opinions about museums and museum learning for preschoolers before their course or seminar attendance and after?
4. Why do they consider that the subject of Museum Education is important for their training as future preschool teachers?

To answer the above questions and mainly to record the students' voices with the aim improving our teaching, we conduct an empirical ongoing action research project on designing and implementing courses and seminars within the subject of "Museum Education".

The main tools of the research are students' feedback assignments during the semester, a questionnaire comprising 45 closed and open-ended questions which was uploaded to the course's E-class platform to be completed optionally by the students at the end of the academic year 2022-2023 and the formal evaluation forms of the University's Quality Assurance Unit (Q.A.U.). At the same time, we kept a research diary to reflect on teaching strategies. It is crucial to perform self-evaluation after such meetings and keep a personal diary of successes and areas of improvement of teaching and learning.

Forty-three female students filled out our google-form questionnaire, which was opened from May to the end of July 2023. The QUA's questionnaires were completed by 35 students for the EPA 135, 29 students for the EPA 138 and 18 out of 20 students for the seminar 145 and 6 out of 20 for the seminar 148. We can observe that a small

number of students generally fill out this type of electronic questionnaires. However, this is approximately the number of students who attend all the 13 meetings. For that reason and because our approach is qualitative and descriptive, we believe that research results are valuable for our aim, which is to listen to and to follow students' voices. Of course, the majority of them are not listened to because they do not speak and that is a major problem. A thematic analysis of the answers was carried out, based on key-phrases related to our research questions.

5. Results and discussion

Interpretation of the data reveals that students need to be heard first and foremost. The attendance habits of students who responded to the google form questionnaire depict that usually the students follow 6-10 out of 13 meetings. The main reasons for not attending the course were the following: Firstly, they don't live in Rethymno anymore, secondly, they have to go to the kindergarten and thirdly they had another obligatory course the same time. Those, who participated in the course and seminar meetings found them more interesting than those, who didn't attend them and feel more joy and less stress.

Students' perceptions about course and seminar design and implementation were in general satisfactory. Generally, they liked that we tried to keep them actively involved through various activities, practical methods and useful combinations of theory and practice, which may help them in their future work. They also loved the time in every meeting for questions, and discussions. Another positive aspect was the understanding and the support both psychological and practical, the absence of stress and pressure, the atmosphere of cooperation and teamwork, which was facilitating learning. Students loved the experiencing activities and field trips out of the university classrooms which made the course content more interesting. As an example, we note that during the spring semester two field trips were organised in the old town of Rethymno and in the Venetian Fortress of the town. The field trips took place in the weekend, and they were optional. In each group participated 22 students. Additionally, all the necessary information was on the e-class, and this made their study easier. They were pleased that learning was not only limited to the classroom but also took place outside it, at museums, in the University Botanical Garden and Library and in the town.

The most tiring aspect of the course was the number of ppt slides. However, it was clarified from the first meeting that the ppt slides were only for those students who wanted to go deeper into "Museum Education". Other problems students mentioned was that the rooms were not adequate for the experiential learning and often there were technical problems with Wi-Fi or projector. They suggested that meetings should be held in a larger room so that there would be more space for activities and later in the day. Students underlined that moments of teaching theory from the chair were very boring. They suggested that they could work on theory in small groups and be prepared for the content of the next meeting. Finally, they proposed even more visits to museums and practice in the kindergarten, related to museum learning and that they could participate in the design of the experiential activities in classroom.

Students' opinions about museums were stereotyped at the beginning of the meetings. According to their words they considered museums are mainly related to history, sculptures, artifacts, culture in general and that they were spaces of silence, admiration, and awe. These prejudices were slightly overturned through the course. They recognized and other types of museums such as geoparks, scientific centres and they agreed that museums offer experiences and environments of discovery. Generally, it is difficult to change the perceptions they have got about museums. Even after the course or the seminar attendance they combined the museum mostly with history, art, culture and knowledge.

Most of the students who filled in the google form questionnaire hadn't heard about the subject of Museum Education before the courses and they believed that museums are not spaces for preschoolers. They explained this belief responding: "The museums are boring for children, even when there is a traditional guided tour for them. Preschool children learn through play and museums usually don't offer playful learning experiences". Other students replied that they did not know about the existence of such valuable Museum Education Programs and the importance of the Museum Education profession. Those who answered that museums are for young children had themselves positive experiences when they were at school, or they have visited a museum with a young child. After the courses and the seminar all the

students believe that museums are also for preschoolers if there are educational programs, staff as museum educators and kids friendly museum environment.

Students consider the course of Museum Education essential for their studies and underline their need for more experiential learning and training in non-formal learning environments, such as museums and public space. Moreover, they notice that not only themselves, but also young children need to learn that researching something for which there is no definite answer make them more open minded and learning less boring. One student mentioned that: "Before attending the courses, I thought that museum education would not be something pleasant but boring. I changed my mind after the lessons!" Other students mentioned that the course was interesting, interactive and gave them experiences and teaching ideas that they wouldn't have considered before. However, as the students themselves responded to the question: "What else could help you to feel more confident to implement museum learning in your kindergarten class?" They referred to the inner motivation to have more personal experiences, practices and of course knowledge about museums, monuments of their local region and the offered educational programs. Additionally, they noticed the importance of the cooperation with family and community.

The research in general provided evidence that personal and emotional changes have occurred within the students themselves because of more student-centred experiential activities during the course and seminar meetings. The enjoyment the students found through engaging with these activities and the feeling that they are more "knowledge builders rather than just consumers" (Safir, 2023) is exactly what we aim to provide for them. Teaching and learning methodology of the pedagogy of voice have served to strengthen the quality of educational experiences, to improve students' cultural and environmental awareness and to empower them as future teachers to be themselves more open to such teaching and learning strategies.

Suggestions and Conclusion

The students need an environment of communication and understanding, where relationships but also love of learning flourish. We may offer an environment of an extended family, where students and professors feel included and have a sense of

belonging. It is important since many students feel alone being far away from their homes. This movement may help students deal with attendance and drop out problems. Additionally, we can discuss with students their continual process of learning through sharing experiences and encourage dialogue, expression and of course class attendance (Mowereader, 2023· Safir, 2023). Breaking with long term traditional teacher and object centered learning strategies is difficult. However, we may start with small changes which are proposed by the educator Shane Safir (2023): 1. Talk less smile more. 2. Prioritize questions over answers. 3. Ritualize reflection and revision, 4. Make learning public 5. Circle up and 6. Favor feedback over grades.

It is also important to take into consideration as criterium for the promotion of a lecturer in the Higher Education not only his/her academic work but also his/her pedagogical work and its evaluation of quality by students. In this regard trainers will also pay more attention to their teaching strategies and combine more often teaching with research.

Finally, a difficult question is what about the voices and the perceptions of the students that do not attend the courses and do not answer the questionnaires. How we as teachers can approach this group of students and research their profiles, their needs with the aim to adopt our teaching strategies and to these absent group. When we embrace "pedagogy of voice" and learner-centred teaching strategies, we have some indices to go on with joy and optimism for the future. I will end with the words of Professor Rowena Arshad (2021): "that it is important to be open to learning, to hearing and to apologise if necessary".

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Students' engagement in research as part of their course requirements

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Abstract. In this case study we portray how students are engaged in conducting research in a participatory manner. In our seminar course we link social theory (Layder 1994, Waters 1994) and research. This is a student centred course, since our aim has been to engage students as equal partners (O'Shea 2018, Dai & Matthews 2022, Matthews 2018, Holen, Ashwin, Maassen & Stensaker 2021, Healy, Flint & Harrington 2014, Bonney 2018) in active learning. Thus, the students and

the course instructor (myself) form a research team and work all together (Lubicz-Nawrocka 2018). Students are instructed and expected to equally participate in this research team and learn actively. They are taught and trained in all stages of scientific research and writing a research report (Gilbert 1993, Robson 1995, Lester 1993, Bell, 1999). In the early stages of the seminar development they have also been involved in constructing the research technique, conducting pilot research and other research processes. Our students were not used to working as a group prior to this course. Despite this lack of knowledge and experience and after a period of training in the beginning, team spirit is gradually developed and good practices are finally shared amongst the research team. During this seminar course the research team discusses issues the students have been confronted with. At the end of the course students are asked to assess the course and the course instructor. The feedback I have received by this assessment has been rewarding and students often comment that they actually acquired knowledge on theory and research in this course, which they do not forget in time.

Key words: *students as equal partners, student centred learning, active learning, research based teaching and learning.*

1. Introduction

In this paper I will depict the ways in which the students and the course instructor of an undergraduate course in a Greek University have all worked together as a group, developing a learning community. Our theoretical stance draws from student centred learning, active learning, research based learning and regards students as equal partners. I will illustrate what a seminar course at the University of Crete presupposes and implies and the particular way in which our group has worked to achieve the seminar objectives and learning outcomes. As emphasis was placed on the students' assessment of the course and the course instructor, I will provide detailed accounts of the students' reflection upon the seminar. I will argue that the collaborative methodology which was applied to this course assisted students to gain benefits such as a better command of social theory, practice of academic research in the field and an innovative way of working in class as a group with their fellow students and instructor. Finally, students appraised the course as a valuable experience through which they acquired deep knowledge. This knowledge was consolidated and persisted in time. Students also accounted that they enjoyed the interaction in class.

2. The theoretical framework

The traditional relationship between students and faculty is considered to be an unequal one, since academic staff usually adopts the role of an expert who teaches and students conform to the passive role of learning. Contrary to this, we agree with the viewpoint that students should be more engaged in the process of learning and teaching and take on a more active role, with a whole team working together as a group to achieve learning outcomes. Seminar courses facilitate the development of participatory and collaborative teaching and learning practices. Furthermore, the shift of emphasis from passive to active learning is anticipated to increase students' enthusiasm and motivation. In addition to this, constant participation of students in the classroom may provide the faculty member with useful feedback on the methodology applied and the course content. Finally, student partnership may engage students more effectively, even the ones who might be reluctant to participate.

In this seminar course, one of our aims has been to introduce and promote innovative pedagogy, new and alternative practices in the methodology of instruction in higher education. Students are more often used to passive learning and we were hoping that a shift of emphasis from faculty to students and from teaching to learning would be welcomed. We attempted to promote reflective pedagogy (Mockler & Sachs 2011), student centred learning, active learning and experiential learning, which are not often put to practice in the teaching of social theory and research methods. Kilburn, Nind & Wiles (2014) identify a lack of pedagogical culture in the field of teaching and learning social science research methods.

In the learning and teaching of social theory and research methods in our seminar course, we chose to apply collaborative learning and students' engagement (Matthews 2018) since these principles were expected to assist students more efficiently to achieve deeper knowledge and participate with enthusiasm. The pedagogical approach of students as partners (Matthews 2018, O'Shea 2018) in teaching and learning in

higher education views students as equal partners in the process of learning. It entails that students and faculty work together in collaboration and students are actively engaged in the learning process (Healy, Flint & Harrington 2014). The collaborative nature of students as partners eliminates hierarchy in higher education and creates a learning community within which the instructor and students contribute to the realization of course objectives.

One of our aims has been to exercise students in conducting research and research design (i.e. the different stages and procedures involved in academic research, such as pilot research, formation of the research technique and so on). This experiential learning where they learnt by doing, aimed at students gaining a new perspective and a deep understanding of the process of research by actually engaging themselves in research. Kilburn, Nind & Wiles (2014) emphasize the importance of experiential learning and specifically of learning by actually doing research. At the same time, we urged this research team to collaborate and work as a group. During the whole semester we continued to provide the students with our support, guidance and consulting.

Over the past decade, there have been numerous initiatives in higher education pedagogy, especially in most English speaking countries and Nordic countries (Holen, Ashwin, Maassen & Stensaker 2021, Dai & Matthews 2022). As for teaching social science research methods in higher education, Nind & Katramadou (2023, p. 259) note that there is divergence as well as convergence in the pedagogy used in recent years and different approaches have been engaged. Nonetheless, experiential learning seems to have not been incorporated enough in the teaching of research methods (Nind & Katramadou 2023, p. 260). As for inquiry based learning, we agree with Bonney (2018, p.1), who argues that involving students in the process of collection and analysis of data promotes inquiry based learning.

3. The Method: description of the teaching approach

Due to the way studies are structured at the University of Crete, students are expected to receive the fundamental theoretical and research preparation during their first two years of study. Then, from the third year on and during their fourth year of study, they are expected to take at least six seminar courses. Seminar courses are consolidating courses which go deeper in knowledge and they are considered more demanding than lecture courses, for instance. For this reason they receive 10 credits (ECTS) whereas lectures and introductory courses receive 5 ECTS.

Before enrolling to seminars, students need to have developed the necessary theoretical and research background. So, in their third year, after they have completed the compulsory courses of the Department and possess the theoretical tools which may facilitate them in studying social theories and applying research methodology, they are allowed to take seminar courses. The study of social theories and / or conducting social research may be requirements in a seminar course. Also, acquisition

of this theoretical background, knowledge and preparation may be a prerequisite so as to enroll in a seminar course.

As opposed to lecture courses, seminar courses facilitate group work in small numbers of students. Thus, the instructor is given the opportunity to smoothly deploy desired teaching practices. A seminar course comprises of 20-25 students each semester. There are small numbers of students in order to ensure knowledge in depth, close guidance by the instructor, and close collaboration with the instructor. It is possible to work closely and more efficiently in small groups. As for how our seminar group operates, we all discuss together in class (the students and the course instructor) about any issue that everyone faces at each stage of the course and the students receive constant feedback from the instructor. They also share information and good practices with each other.

Every week, during the course, I follow up the students closely and offer them feedback. They are trained and closely supervised in every stage of the course. They report how they have progressed and what they have achieved during the past week. I also offer them close guidance and counselling. Corrective actions are proposed by me and questions are answered, suggestions are made or instructions are given on how to proceed. Everyone listens and learns from each other's issues. Students can also suggest to the group solutions that they themselves have followed (such as using social media at cases, e.g.). Reflection is involved in classroom communication during this seminar. Students are encouraged to adopt a reflective stance towards their work and the group's work (they comment on other students' presentations of their work, contribute with ideas and propositions and so on).

Constant communication outside the classroom and during the week is accomplished via electronic means and the course electronic platform. I also have everyone's e-mail so that there is direct information and communication with everyone separately and with the team as a whole. We solve everyone's issues in the classroom so that everyone can hear and learn from their fellow students and their own experiences. This way, students may follow the good practices of others (e.g. how to locate the sample or data gathering). Students enrolled in the course practice in team spirit. I am at their disposal both by e-mail and by phone at the office during the week and not only during class, so that students may receive answers and proceed in their work without waiting for the next lesson. Thus, guidance and monitoring is also individual and primarily takes place face to face at the office.

Students are trained in the research process and writing the research report. They exercise in applying social theory in practice and conducting research based on theory. In particular, they examine theories of the Sociology of Education, on which we focus. I practice them on filling in the research technique, which is usually either a semi structured interview or a questionnaire. Obviously, the requirements cannot be very demanding since students usually have no prior experience in conducting research. In the first semesters this seminar was offered, I have also involved students in the formation of the research technique. Later on in each semester, students undertake a public presentation of their work in class. As part of their evaluation the

students also deliver their seminar essay at the end of the semester, which is in the form of a research report.

What students do is to connect the theory of Sociology of Education to research on the one hand and exercise themselves in the different stages of the research process on the other hand. This “exercise” is the means to practice active learning and experiential learning. At the same time, they study and analyze bibliography. In summary, students study a piece of theory in the sociology of education. Then they conduct a small piece of research which puts into practice the theory studied. They present their work in class and write a small report on their work. They hear their fellow students’ views and propositions, they answer questions and gain in depth understanding of the theory and the academic research process. Thus, a collaborative learning community is developed since students also learn from each other (Lubicz-Nawrocka 2018, p.53).

4. Students’ reflection on the course and their overall experience

Aiming to examine the organization of the course and the experiences of the trainees I relied on the process of assessment (Robson 1995) and students’ responses. Students participated in the process of reflection on our educational practice (Mockler & Sachs 2011). The idea was to apply reflective pedagogy so that the students’ feedback could be taken into account. Their propositions could initiate improvements, in case there was a need for changes to be introduced. The questions included in the assessment was a means of evaluation of myself as course instructor and of the course itself. The students were eager to fill in all assessment questionnaires and I received a lot of feedback. Their answers provided characteristic sayings. Recently, the University itself initiated another questionnaire assessment, which students were asked to fill in electronically. Students also filled this in and provided their views respectively.

This seminar course has been offered at the Department of Philosophy and Social Studies of the University of Crete for six semesters from 2017 to 2022. During four of these semesters I have asked students for their feedback through their assessment of the course and myself. The remaining two semesters there had been no assessment in class due to the covid19 pandemic. The University of Crete assessment took place in 2022. All assessment procedures were anonymous and the ones conducted by me were delivered in class amongst the students themselves and after completion collected by them and handed to me later.

52% of the students who assessed the course and the instructor replied that they acquired useful and even valuable knowledge from the course. These were open questions, each student could answer freely, thus answers do not sum up 100% since students could answer more than one thing they acquired from the course. 48% of the students answered that they gained knowledge and experience on how to conduct research, take interviews or fill in questionnaires. As explained in detail by Year 1 Student 12 (Y.1 St.12): “I learnt how to take interviews – since I had not been offered the opportunity to endeavour in this in the past. I was taught how a scientific research is conducted and how the data from a research are analyzed”. 16,9% of the students

also commented that they learnt social theory and 10,4% of them improved their presentation skills. 7,8% mentioned that they learnt how to study and analyze statistical tables and a 6,5% emphasized the practice on bibliography search and consultation.

In particular, Y.1 St.5 stated that "...what is very interesting... is also the excellent communication with the seminar members, which helped its smooth operation", Y.1 St.10 that "The course... promotes discussion..." and Y.1 St.11 that it "...gave me food for thought and encouraged me for the future". Y.2 St.3 "...was prepared for postgraduate studies" and according to Y.2 St. 4 "What is very important in this seminar is that the way it is conducted is very interesting". For Y.2 St. 6 "The development of critical thinking..." in the seminar was important. Y.5 St.2 noted that "...had I not attended (this seminar) I would have no idea on the knowledge I acquired..." and Y.5 St. 3 was more analytic: "...I learnt more about specific Sociologists and the seminar theme urged me to search for relevant books for my personal development".

Y.5 St. 9 shared that "...it's my first seminar and I can say with confidence that it was the best way to start my seminars" and Y.5 St. 13 said: "I clarified terminology and data, acquired knowledge unknown to me so far and I was eager to attend and motivated for the future. Also, (I obtained) skills useful for the future". Y.5 St.14 was pleased that "...the most important knowledge and skills... was the research process, unknown and extremely interesting to me". Y.5 St. 16 added that "Attending this course creates thoughts and questions and clears up a lot of things...". The following saying by Y.6 St.5 is most characteristic of the course dynamics and interrelations: "By this specific course and the Professor we are given the possibility to express our thoughts freely... the specific seminar is very different to the others in the Department. I learnt things I had never heard". Y.6 St. 9 was contented that "...we are discussing and presenting our work" and Y.6 St. 11 similarly reported that "...we worked in depth". Y.6 St.19 concluded that "...the most important knowledge I gained is that undertaking a research entails great organizing, preparation and patience".

In an open question students were asked about their overall experience in this seminar. Most students appreciated the communication and development of dialogue in class, the accessibility of the instructor throughout the week via electronic means, the interest of the instructor for personal assistance and consultation and the pleasant pedagogic climate in class which involved close relations, cooperation, encouragement and respect. Other students emphasized the consistency and supportiveness which prevailed. Y.6 St.11 commented that all this interaction was helpful for the students' psychology as well. Y.6 St.13 and Y.6 St.16 appreciated the encouragement for students to be active in class among other things. Y.6 St.14 and Y.6 St.16 were satisfied with the guidance the team received. For Y.6 St.16 and Y.6 St.19 guidance and encouragement were some of the reasons the seminar proved to be a lot "easier" than it had appeared at the beginning.

In another open question the seminar students were invited to offer their propositions about the course (they were free to respond in any way they chose). Most of them had to comment that the quality of teaching and learning was at a very good level (Y.1 St.1, Y.1 St.12, Y.1 St.14, Y.1 St.18, Y.2 St.7, Y.2 St.8, Y.5 St.2, Y.5 St.12, Y.5 St.13, Y.5 St.14, Y.5 St.16 and Y.6 St.14 amongst others). Others said that they were pleasantly surprised (Y.1 St.2). They expressed satisfaction and specifically the teaching methodology was appreciated (for instance, by Y.2 St.9). Y.2 St.14 regarded that “good job was done” both by the students and the instructor and Y.6 St.9 thought that the job that was done was impeccable. Y.6 St.11 argued that the creative work of this seminar should continue in the same systematic manner whereas Y.6 St.13 and Y.6 St.18 noted that the seminar work was excellent.

What has been most rewarding, touching and flattering is that when students are satisfied with the course, their assessment reflects on the instructor herself. So, students took the opportunity of the last open question where they were asked to add any comment they might have, to give accounts such as the following. For instance, Y.1 St.14 was “...confident that the instructor is one of the best professors in the department, for the reasons mentioned above”. Y.1 St.2 mentioned that the seminar was pleasant and Y.5 St.9 “...throughout the whole semester felt very comfortable in this seminar and free to contribute (her/ his) view”. Y.5 St.13 noted “You gave me motivation to continue until the degree and to pursue what is after. Thank you” and Y.6 St.11 exclaimed “...continue like this. We love you!”. Y.6 St.14 proposed “I would like more seminars with the specific professor because she made me understand that there is nothing demanding which is not achieved with the proper guidance”. Y.6 St.19 made a similar observation emphasizing aspects of character. Other students extended their wishes (Y.6 St.17) or expressed their deep satisfaction (Y.6 St.18).

According to a different assessment of the course, which was administered by the University in 2022 electronically and independently of the course instructor, 92,86% of the students were very satisfied with the organizing of the seminar. 64,3% of the students replied that the seminar helped them develop their skills and abilities very satisfactorily and 28,6% thought it helped them satisfactorily. 85,7% of the students were very pleased with the way the instructor encouraged students’ questions and observations and generally promoted dialogue during class. When asked about the strong points of the seminar which should be retained, one student replied: “The chance all participants have to express themselves. We operated as a team and as a result we could comprehend everything the seminar included in each lesson”. In this University assessment, in open questions where the students could express themselves freely, they chose to make very praising remarks about the instructor and extend their thanks to the instructor of this seminar. They made very appreciative comments on the cooperation and communication in the seminar. One student liked the seminar so much that she / he proposed that more professors should adopt similar methodology

and another student thought the consulting was excellent. Finally, one student stated that he or she chose the seminar because he / she was inspired by the instructor.

5. Discussion: benefits students obtained from the course

Students were asked for their propositions on this seminar course and their accounts on their experience from the course provided us with useful and enlightening insights. They expressed high levels of satisfaction and enthusiasm about the outcome. This assessment took place as an attempt for evaluation of and reflection upon the course. Students' reports indicated that they recall the course as a valuable learning and participatory experience. According to them, they obtained deeper knowledge in social theory and scientific research conducting, and this knowledge persisted. They discovered in practice how demanding and time consuming it is to carry out research and the strict principles (such as the anonymity of the research subjects) that are required to be followed. They also enjoyed the trust and responsibility which was placed upon them in the different stages of their effort to conduct academic research.

They stated that they have gained knowledge and have developed skills and abilities, but these have been achieved in a participatory manner. The course pedagogy has not only fostered knowledge acquisition and consolidation, but, maybe more importantly, the development of a learning community and close ties amongst the students and the instructor. After completing this course, students usually ask the instructor to be enrolled in more similar courses, seeking to experience the same pedagogy again.

There have definitely been challenges faced. Students were not experienced in research conducting and were not always aware of the research ethics, terminology and other issues related to the process. Thus, there could not be excessive demands and close monitoring and consulting of the whole team was necessary. This can be quite time consuming, however. Other challenges had to do with time constraints. The course objectives have to be met at the end of the semester and students' work has to be completed by the same period.

Students had the chance to reflect upon social theory and research and familiarize themselves with the complex process of research, its numerous limitations and its connections to social theory. Therefore, they realized whether they are interested in theory and research and if they would like to pursue further studies in postgraduate level. On the other hand, probably some students discovered that this does not suit them. Finally, some of the changes suggested by the students, that I would like to be implemented in the future, are conducting more qualitative research and engaging students more in the formation of the research technique. These aspects have not been emphasized as much as I would have preferred due to time constraints. Nonetheless, the feedback I have received from this course has been valuable and will be applied to other courses in the future. I also deeply appreciate the close ties which were developed with students.

6. Conclusions

The teaching and learning methodology in this seminar has been an effort to apply collaborative and reflective pedagogy in higher education. There were challenges faced, but the research team focused on student centred learning and emphasis was placed on students' assessment of the course and the course instructor. Students enjoyed the team work in class with their fellow students and instructor and the exchange of good practices.

As a result of the interaction in this seminar, which was unprecedented for some students, they obtained knowledge, skills and realized the course objectives. In addition, they developed group spirit and learnt how to work as a group, they built a learning community and got engaged in their own course, they practiced active learning and research based learning. Hopefully they will include this inquisitive spirit to their work in the future. Students felt they gained a valuable experience but it has also been an extremely valuable experience for the instructor, one that I intend to repeat in analogous courses.

The research team in this seminar gather that change has been brought about in the field of higher education. We believe that the pedagogy applied constitutes a proposal, an innovative change in learning and teaching in higher education. It could be adopted as good practice in the methodology followed in other courses (possibly not only seminars). This pedagogy could be explored and developed further so as to be applied to courses with different content and syllabus. The experience for participants, both students and instructor, promises to be rewarding.

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Section C

**Academics' needs,
perceptions & attitudes**



11. Identifying faculty's competences and academic development needs in a research-intensive university in Europe [Symposium]

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Abstract. To be aligned with the European Commission standards for teaching in Higher Education, a research-intensive university initiated research to identify faculty's competences and academic development needs. The analysis was based on 8 axes: student-centred learning, inclusion, digital readiness and digital equity, students as equal partners, teaching and research nexus, formative assessment and curriculum development. These themes came as a result of a literature review which preceded the needs analysis.

scoping
Following quantitative analysis, findings suggest that faculty members are striving to improve their teaching and learning skills and knowledge. We also conducted follow-up research through interviews with a sample of the faculty useful, as the qualitative approach to questionnaire findings can highlight individual needs through the description of the educators' experiences and the analysis of their authentic voices (Robson, 2007). Findings also indicate several academic development needs in each area analysed, paving the way for the design and creation of academic development education courses that need to be further explored.

Keywords. *Faculty needs; academic development; student centred learning; inclusion; digital equity; digital readiness, formative assessment; students as equal partners, education research; teaching and research nexus; curriculum reform*

1. Introduction

Even before Covid 19 pandemic and although such voices were often questioned regarding their feasibility (Schweisfurth, 2011), higher education researchers called for the need to shift away from teaching and learning models that are based on passive assimilation of knowledge towards models that place ‘the learner in the driver’s seat’ (Rege Colet, 2017), where students must have increased control of decisions in the learning process (Nunan, 2013). In her book, *Learner-centred Education in International Perspective: Whose Pedagogy for Whose Development?*, Schweisfurth (2013) observed five shifts of learner centred education over the centuries:

- Technique – A continuum from ‘frontal, “chalk and talk”, “transmission”’ to ‘independent or group inquiry’;
- Relationships – A continuum from ‘authoritarian’ to ‘democratic’ classroom relationships;
- Motivation – A continuum from ‘extrinsic’ to ‘intrinsic’ learner motivation;
- Epistemology – A continuum from seeing ‘knowledge as fixed’ to seeing ‘knowledge as fluid’. (Summarised from Schweisfurth, 2013, 11–13 in Bremmer, 2021)

During Covid 19 pandemic, Bremmer (2021) conducted a meta-analysis of 326 journal articles where 6 themes associated with student-centred and learning centred definitions and theorisations became prevalent; ‘Active participation’, ‘Adapting to needs’, ‘Autonomy’, ‘Relevant skills’, ‘Power sharing’ and ‘Formative assessment’ (Figure 1) concluding that the findings of his meta-analysis confirm a “messy” construct that has been interpreted in a variety of different ways in the literature.

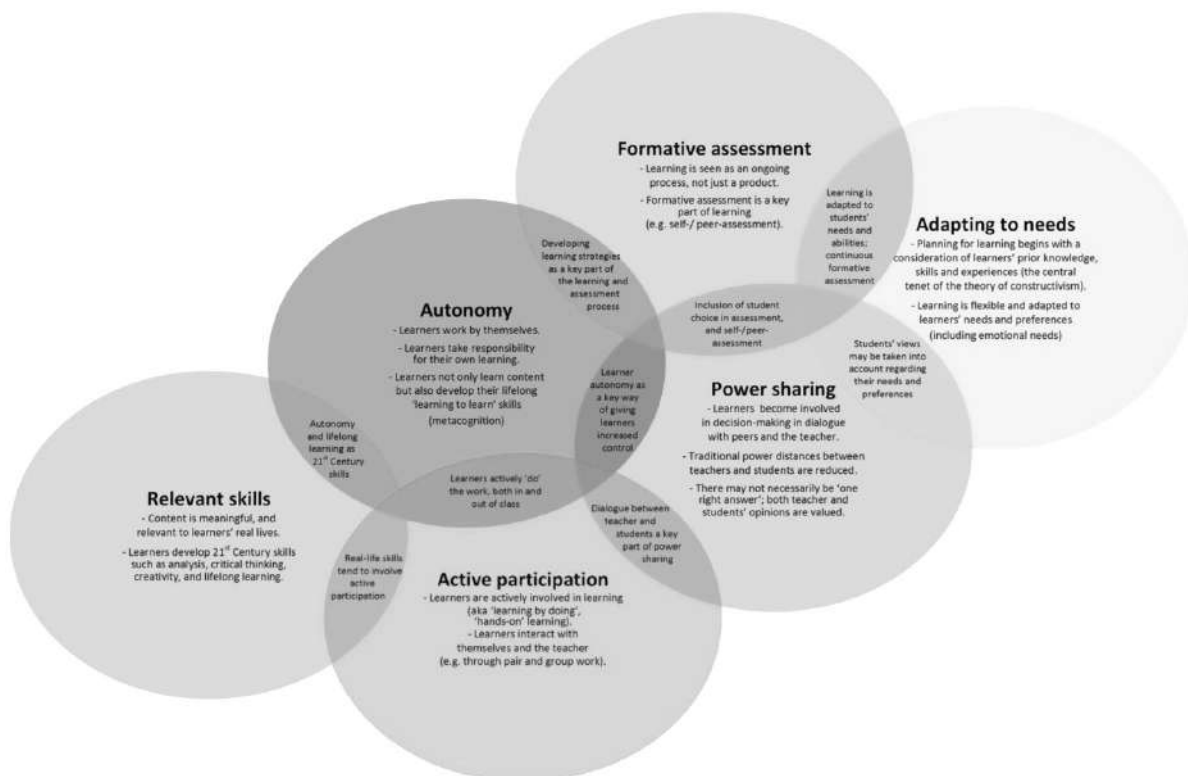


Figure 1. Visual representation of student-centred and learning-centred definitions based on Bremmer's meta-analysis of 326 journal articles (From Bremmer (2021)).

During the Pandemic, such ‘messy’ conceptualisations of teaching and learning ought to be addressed in higher education (HE) in response to EU Commission Directorate (2021) so as to allow for the expression of often muted or suppressed voices and the improvement of teaching methodologies. Emergency online teaching and rapid digitalisation of higher education during

Covid enhanced our awareness that some face-to-face and online teaching models may not be appropriate as certain groups of students may be under-privileged. As such, digital equity (Willems, Farley and Campbell, 2019) and proactive social models of inclusive education became the new buzz words for higher education pedagogy (Katsampoxaki-Hodgetts, 2023).

Seminal publications on the *Scholarship of Student Engagement* and *Students as Equal partners* (Bovill, Cook-Sather & Felten (2011) were embraced by even more academic developers and higher education researchers. In this new landscape, academics ought to adapt their teaching and curricula, listening at the same time to voices that may have been underestimated, like those of students. Following the pandemic, these new realisations also activated old discussions regarding the research-teaching nexus in HE; the question remains whether focusing on research only and neglecting quality teaching should still remain as a priority of universities' strategic goal (Gros et al., 2020) as by emphasising in research and not in teaching, academics may be doing so at the expense of student skills regarding academic success.

Based on these new realisations following Covid 19, the aim of this paper is to present the findings of a needs analysis (questionnaire and interviews) so as to identify academics' competencies and potential academic development needs that can inform the design and content of ensuing academic development educational material provided by the corresponding Teaching and Learning Centre.

2. Scoping literature review prior to the questionnaire

In our attempt to design a comprehensive needs analysis plan that can showcase faculty competences and needs in terms of student-centred teaching and learning, we conducted a scoping literature review (Arskey and O'Malley, 2005). Our literature review had a broad scope within the *Scholarship of Academic Development* regarding any techniques, approaches, methods and prevalent conceptualisations of student-centred teaching and learning as well as innovative teaching.

As well as Bremmer's (2021) conceptualisations of student-centred learning, the literature on challenges that academics face before embracing or//and towards implementing learning centred teaching was instrumental on our design (Wright (2011). We also took into account Weimer's (2013) key practices that teacher-centred academics must change to implement learner-centred teaching such as (1) the function of the content, (2) the role of the instructor, (3) the learning responsibility, (4) the assessment goals and procedures, and (5) the checks and balances.

A prominent conceptualisation of student centred teaching and learning was through the lens of the *Scholarship of Student Engagement* and *Student Agency* which prioritised fostering higher order cognitive skills within a learning environment that encourages student collaboration, creation and reflection. Drawing on active learning and student engagement, Cook-Sather (2011) presents pedagogical practices faculty use to promote student engagement, agency and reflection. In the same vein, Misseyanni et al. (2018) connect prevalent learning theories such as constructivism, motivation theories and design-based theories to active learning and present active learning practices in HE including a. Interactive lectures, b. Visual-based active learning i.e. films c. Classroom assessment techniques, i.e. CATs, d. Experiential learning, e. Flipped or Blended learning, f. Case study analysis, g. Problem-based learning, h. Creative activities, i. Creative activities, k. Gamification, l. Collaborative learning, m. Community based learning and research-based learning. Older studies about student agency and self-efficacy also showed they can affect

motivation and perception by influencing students' interest in tasks, persistence with tasks, goals, choices and the use of cognitive, metacognitive, and self-regulating strategies (Zimmermann, 1995).

In terms of power hierarchies in HE and student-teacher relationships, and in line with the Scholarship of Students as Equal partners (Bovill, Cook-Sather & Felten (2011), engagement of students as co-creators of teaching approaches, course design, and curricula in Higher Education contexts is often associated to adopting a holistic social inclusive education framework that is conducive to academic success. This framework does not rely on labelling students according to learning needs or disabilities and it is not dependent on awareness of student deficit conditions or traits. This model is a proactive pedagogical decision plan that promotes all students' access, engagement and success without labelling (Katsampoxaki-Hodgetts, 2023). According to Doménech et al. (2023), faculty members can play a decisive role and “can provide decisive help to prevent students from dropping out of the university and guarantee their academic success (Lombardi, Murray & Kowitt, 2016)”. Carballo et al. (2019) confirmed that adopting an inclusive social model helps academics realise that they can be held accountable by how they design courses that are proactively inclusive and appropriately align learning environments, processes, and resources. Within this context, digital equity is an equally important aspect of inclusive education (Willems, Farley, & Campbell, 2019) and educators need to know how to use digital tools to enhance student learning.

Drawing on digital readiness, a systematic review by Händel et al. (2022) stressed the need for academics to support of higher education students in successfully coping with the challenges of emergency remote studying, and their digital and academic skills. Based on academics self-reported competences, regarding professional training in digitalisation in teaching, Amhag et al. (2019) findings indicate that teacher educators need extensive pedagogical support in creating digital teaching in their own teaching and learning context to increase motivation for concrete learning outcomes that facilitate student success.

Neumann, R. (1996) in his review of the higher education literature reflects three approaches to examining the teaching-research relationship personal commentary and analysis, the correlation between measures of teaching effectiveness as measured by student ratings and a measure of research productivity based primarily on the number of publications. He contended that a necessary but not sufficient condition for good teaching is students' active involvement in research. More recently, Gros et al. (2020) examined ways that nexus between research, teaching and learning can inform each other in a mutually beneficial way and highlighted the need to develop specific actions to achieve this objective including reviewing teaching plans, engaging students, in research activities through inquiry-based (IBL) contexts, and the need for academics to master instrumental competences. The design of a research-based or research-inspired curriculum helps lay a strong foundation for the teaching-learning-research relationship; as such, it is not based on content but on a dynamic concept encompassing all relationships and activities that enhance student learning (Gros et al., 2020).

In this context, the curriculum cannot be reduced to learning outcomes, engagement activities and assessment tasks (Tam, 2014). Hence, constructive alignment of goals, assessments, and teaching/learning activities facilitates teacher and student achievement of the intended program (Biggs, 1996). Backward design is also a commonly used design strategy that facilitates constructive alignment of desired outcomes in conjunction with acceptable evidence of those outcomes, then design learning and teaching in a corresponding way (Wiggins & McTighe, 1998).

Another systematic review by Griffioen, Groen and Nak (2019), based on an initial set of 5815 journal articles in a wide number of disciplinary fields, 121 articles were selected for further analysis regarding ten curriculum related aspects associated with the connections between research and teaching: Rationale (Why are they learning?), Aims and objectives (Towards which goals are they learning?), Content (What are they learning?), Learning activities (How are they learning?), Teacher role (How is the teacher facilitating the learning), Materials and resources (With what are they learning?), Grouping (With whom are they learning?), Location (Where are they learning?), Time (When are they learning?) and Assessment (How is their learning assessed?). Their findings suggested that teaching should not be based on assessment only and that competencies on all the above aspects are necessary when systematically implementing 'research' in the curriculum.

The shift of Higher Education Pedagogy focus from assessment of learning and summative assessment to Assessment for learning and formative assessment became prevalent in Wiliam (2011:6) who defined "assessment for learning [as] any assessment for which the first priority in its design and practice is to serve the purpose of promoting students' learning. It thus differs from assessment designed primarily to serve the purposes of accountability, or of ranking, or of certifying competence." As formative assessment does not necessarily provide feedback to students regarding their progress, Broadfoot et al. (2002) used the term *assessment for learning*, to describe "the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there" (ibid; 2–3) thus highlighting the importance of metacognitive awareness on behalf of the student. As cited by Wiliam (2011) "*Activating students as owners of their own learning* clearly draws together a number of related fields of research, such as metacognition (Hacker, Dunlosky, & Graesser, 1998), motivation (Deci & Ryan, 1994), attribution theory (Dweck, 2000), interest (Hidi & Harackiewicz, 2000) and, most importantly, self-regulated learning, defined by Boekaerts (2006) as "a multilevel, multicomponent process that targets affect, cognitions, and actions, as well as features of the environment for modulation in the service of one's goals" (p. 347)".

According to Blumberg (2009), a key factor that influences faculty adoption of learning centred approaches is overcoming the perception that learning-centred teaching approaches are complex, by defining separate components that make it easier to understand (Blumberg, 2009).

3. Context, Aim and Study design

Context

In order to respond to top down pressures imposed by European funding and the Ministry of Education in Greece, almost thirty teaching and learning centres were created in Greece aiming at conducting needs analysis, create appropriate academic development content and contribute towards the improvement of teaching and learning in Higher Education. Questionnaire respondents comprised faculty in a research intensive university in Europe that had implemented a bottom up academic development initiative three years before this study and in which attendance of faculty and teaching staff was optional. The research took place from September 2022 until December 2023, and it was approved by the University's Research Ethics Committee on 11/10/2022.

Aim and perspective

Prominent emerging themes from the literature entailed: a. Student-centred learning, b. Inclusive learning c. Reforming curriculum d. Formative assessment and assessment for learning, e. Enabling the connections between research and education in the curriculum, f. Students as Equal partners, g. Digital readiness and h. Digital equity. Following the emerging themes in the literature and the

European Commission and the guidelines (2021) the research was developed and analyzed under these 8 axes and the main aim of this research is mapping existing competences and needs through these 8 axes.

Datasets

The questionnaire was constructed with 38 questions, 12 closed and 26 open questions. The questionnaire was divided in three parts. In the first part the participants were aware of the aim of the research, the duration, the Research Ethic Committee license, the number of the questions. In the second part a secret code was created for each participant to ensure anonymity of participants. In the third part, the first 12 questions are closed questions based on the Likert scale, while the following 26 questions are open ended. Two questions are not aligned with the 8 axes, and they concern other suggestions the participants would like to mention regarding academic development. In general, the questions were not aligned one by one with the 8 factors, since in some cases the participants provided answers that concerned many factors, especially in the open-ended questions. For instance, in the case of Digital equity, the participants provided answers regarding inclusion and digital awareness as well.

Table 1. *Factors addressed in needs analysis questionnaire in closed and open questions.*

		Closed questions	Open questions	Total
1	Student center learning	2,4	1,3	4
2	Inclusive learning	5,12	4*,8	4
3	Digital awareness	14,15	9,13	4
4	Digital equity (tools and multimodality)	14	10, 13*, 16, 17	5
5	Teaching and research nexus	18, 21, 24	6*, 19, 20, 25	7
6	Students as equal partners	12*	11, 22, 23	5
7	Formative assessment	29, 30	27, 33, 26	5
8	Curriculum Development (alignment between goals and needs)	34, 31	32, 35, 36	5

As you can see in Table 1, to each factor correspond 4-5 questions, while in the teaching and research nexus corresponded 7 questions, since it is the factor that relates to all other factors (Griffioen, Groen and Nak, 2019). All in all, 146 questionnaires were submitted following three kind reminders to Faculty and teaching staff.

Semi-structured interviews were taken from 16 faculty members from each department of a research-intensive university, carried out through Skype from December 2022 until May 2023 prior to data analysis (conducted from March till July 2023). The semi-structured interview was

considered the most suitable research tool in the form of an informal long discussion (Robson, 2007). Interviews duration ranged between 35 to 75 minutes and there were 8 double questions that were posed to interviewees. The first question was the same but specific to each axis: how the faculty perceives it (e.g. student-oriented learning) and what practices they use to implement it. Critical insights from the questionnaire were used to enrich the discussion. Thus, the second question asked the faculty member to comment on one key finding in the questionnaire in the same axis. The conduct of the interviews was also approved by the university Ethics Committee and the anonymity of the participants was preserved. The initials 'S' for the researcher conducting the interview and 'E1', 'E2', 'E3'... 'E16' were used instead of the names for the interviewees.

The sample falls into the category of purposeful sampling, equal representation of genders was pursued from two university campuses (one focusing on Economic and Humanities and the other on STEM and Medicine). Everyone interested could be interviewed, as the main criterion for the selection of the sample was to be faculty teaching.

Concerning the data collection, one of the restrictions was the small sample, yet it was adequate enough to provide insightful information. Another restriction is that the sample consists of faculty members who willingly participated. These are academics interested in teaching, with some of them specialising in the topics interviewed as they have participated in workshops and peer-discussions held by the University's Teaching and Learning Centre and, most importantly, they wished to contribute to the research sharing their knowledge and expertise. The latter can explain any differences in findings in comparison to the questionnaire where the sample was random and much bigger.

Data analysis: questionnaire and interviews

The open ended questions were analysed following Thematic Analysis (Braun and Clarke, 2006). using Nvivo 2023 software. The closed questions were based on the Likert scale or yes/no questions and were analysed qualitatively. The open-ended questions were analysed with mixed methodologies. In the first phase categories were identified for each of the open-ended questions and then the themes that were repeated were recognised. And then the categories were analysed with quantitative method to identify the needs of the staff. This analysis did not deteriorate the participants' perspectives since the scope of the questionnaire was to identify the needs, while interviews took place after the questionnaire.

Critical insights from the questionnaires was utilised in the interviews to enrich the questions and the answers and to identify the needs of the teaching staff and faculty. The method we used to analyse the 16 interviews was thematic speech analysis. It is a "method of identifying, describing, reporting and thematising repeated semantic patterns", i.e. "themes" that emerge from the research data (Isari & Pourkos, 2015, p.116). It is characterised by "theoretical freedom" or "flexibility" and its selection as a method of analysis does not presuppose the researchers' commitment to specific epistemological positions, but they emerge through the speech analysed. We followed the suggested stages of the method: transcription, familiarisation with the data, i.e. locating and gathering the excerpts that correspond to each question, coding, searching and naming the topics and reporting the findings (Tsiolis, 2018).

4. Results and Discussion

In this section, questionnaire and interview findings are presented through a thematic lens corresponding to each of the 8 aforementioned axes.

4.1 Questionnaire results and discussion

Student-centred learning

In terms of student-centred learning at a research-intensive university, faculty members supported that they connect learning with their students' needs and experiences (60%) (Figure 2). Nevertheless, this is done mainly by posing questions to the students (49%) or through the questions the students pose to the teachers (21%). There are cases in which the teachers promote dialogue (26%) and facilitate active learning (11%) as mentioned in Misseyanni et al. (2018) (Figure 3).

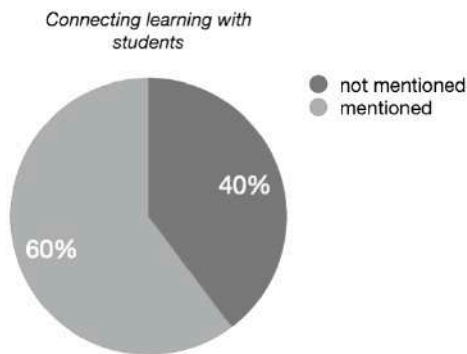


Figure 2. Thematic analysis results considering connecting learning with student needs in the question: Outline the typical structure of your daily lesson (what actions do you do first, what next, and what at the end?)

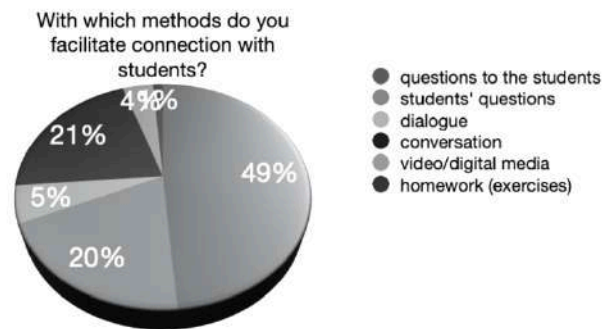


Figure 3. Faculty responses to the question With which methods do you facilitate connection with students?

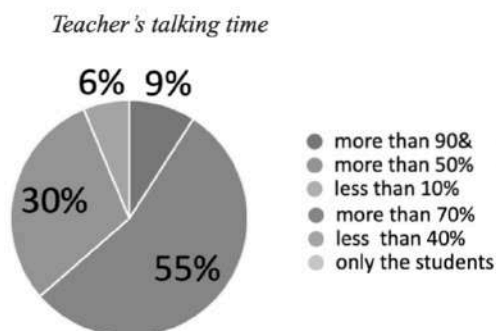


Figure 4. Faculty responses to the question 'How much time do you talk during a typical lesson (e.g. lecture) in relation to your students?'

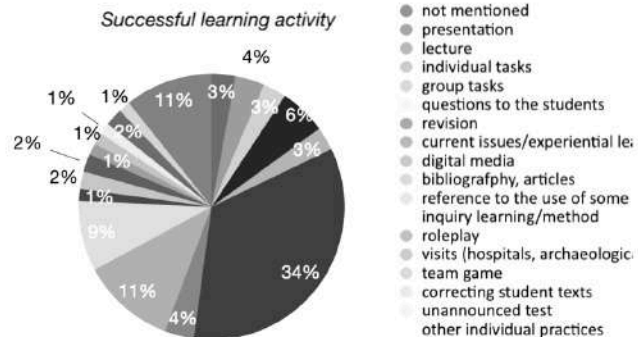


Figure 5. Faculty responses to the question 'Please mention a successful activity you adopt to get your students actively involved'.

Although 24% of the participants in the research considers posing questions to the students a successful activity, only 11% of faculty members reported utilizing productively active learning strategies such as cases studies, problem-solving or experiential learning. Also, faculty members that use active learning teaching practices, use of images, assessment at the end of each lesson, reflection, alternative digital media, homework, brainstorming, use of words/keywords, debate, warming activities for knowing better the students, embodied learning, and micro script construction are very few (Figure 3 and 5). Based on faculty responses, instructor monologue characterised the quality of classroom communication between students and teachers, since 9% of faculty talks more than 90% of the time, a 55% talks more than 70% of the time, and 40% talks more than 50% of the lesson time (Figure 4).

Emerging academic development issues inferred in faculty responses and compared to the literature suggested the need of empowering academics to recognize the importance of student engagement and active learning based on evidence-based research providing at the same time a list of suggested practices that enhance student centred learning. Another important follow-up action could be to promote existing good practices within the academic community so as to make them more prominent, hopefully resulting in more academics using reflective, participatory and active learning strategies with or without the use digital media.

Inclusive education and learning needs

Although student prior experiences are reported to be taken into account during teaching and learning by 46,9% of Faculty, there is some discrepancy regarding lack of instructors' attempt to learn more about students' social, cultural, cognitive and cultural background. To promote inclusive learning it is crucial to be aware of students' background and needs before proceeding into learning design and making pedagogical choices (Figure 6). Difficulties in adapting the educational content to the students' needs were prevalent in Figure 7, since the majority (42%) is not exactly sure about how they could be modifying the content and a 31,5% is negative (or extremely negative, 10.5%) regarding making such modifications.

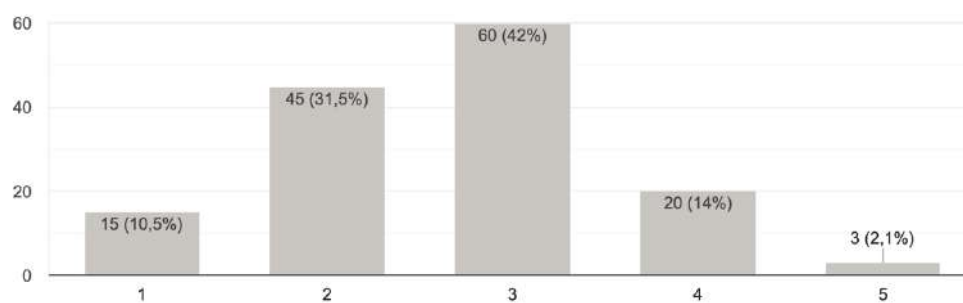


Figure 6. Faculty responses to the question 'To what extent do you adapt your teaching to the students' experiences (1=little, 5=very much).

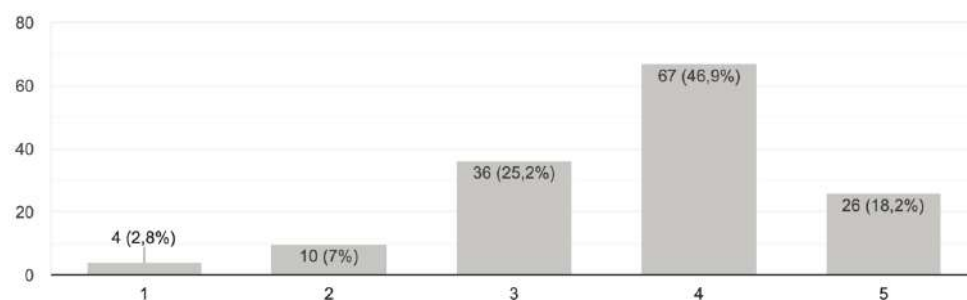


Figure 7. Faculty responses to the question 'To what extent do you think your course could be modified to make it accessible to all students? (1=a little, 5=very much)'

Most importantly, although 62% of faculty reported that they are aware of differentiated learning (Figure 8), when they were asked to describe practices to differentiated learning, 39% of them answered that they adapt the content but they did so without mentioning the way they do it or the educational tools they use (Figure 9).

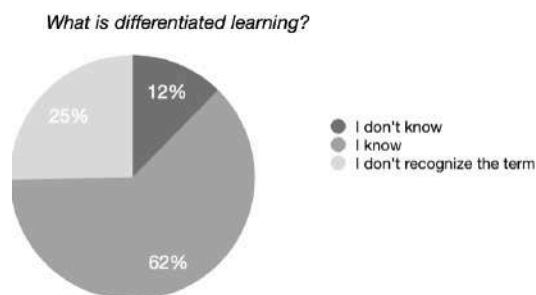


Figure 8. Faculty responses to the question 'What is differentiated learning?'.

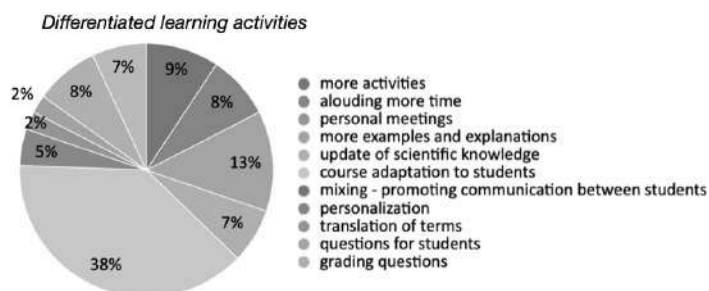


Figure 9. Faculty responses to the question 'Describe activities you use to differentiate student learning'.

In terms of language related (and ensuing cultural) aspects of inclusion (Figure 10), the faculty seemed to have experience with expatriated students that return in Greece since they allow for personal communications (22%), advise students to ask consultation and support from University services such as the Teaching and learning centre or the Writing center (10%). They also seem willing to switch to English as a Medium of Instruction (EMI) (18%) when necessary. Based on their responses, a variety of strategies such as English edition/sources in English, online meetings to foster collaboration with fellow students, encouragement to learn Greek, personalised learning, the teacher translation of their notes in English, exercises according to the level of understanding, provision of support material prior to the course and the supply of figurative lexicon and quizzes were some of reported practices.

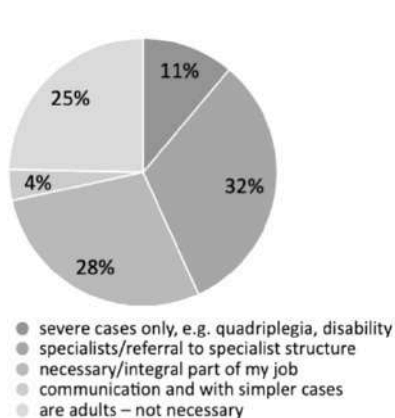


Figure 10. Faculty responses to the question 'if a student in your department, has serious problems understanding the language. What would you do to help him/her?'

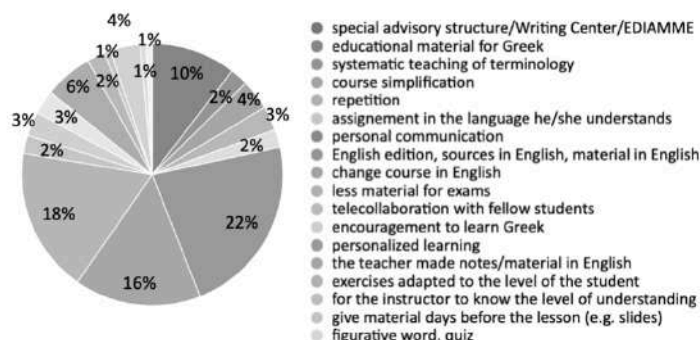


Figure 11. Faculty responses to the question 'In which case and why do you communicate with the parents who have students with special needs?'

Faculty responses were divided in terms of contacting the parents of students with disabilities or special needs (Figures 11 and 12). In fact, 52% of them were in favour of such communications and 40% were not. The former group stated that such communications are necessary when specialists suggest it (32%) and 11% of them stated that they would communicate for severe disability-related cases such as quadriplegia. Faculty who were not in favour of such communications did so based on the fact that student are adults (25%) (Figure 13). Subsequently, some faculty seem aware that the students with special needs are not a group that need to be treated differently and that there are special groups in the university that provide additional support and guidance.

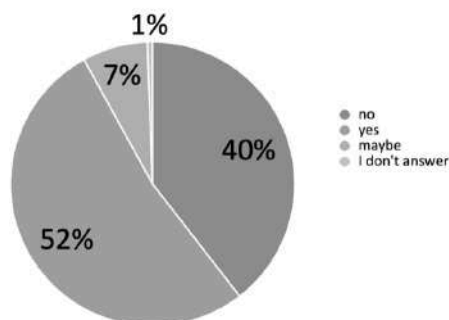


Figure 12. Faculty responses to the question 'Would you communicate with the parents of a student with special needs or disabilities?'

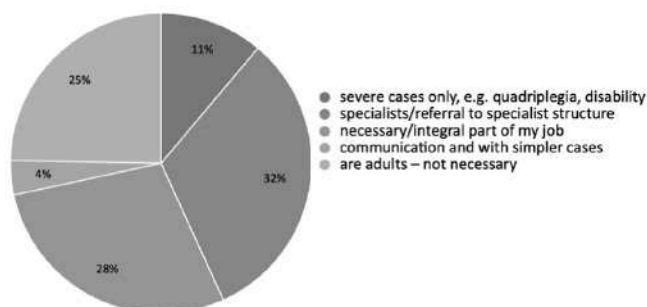


Figure 13. Faculty responses to the question 'In which case, would you communicate with a student's parent?'

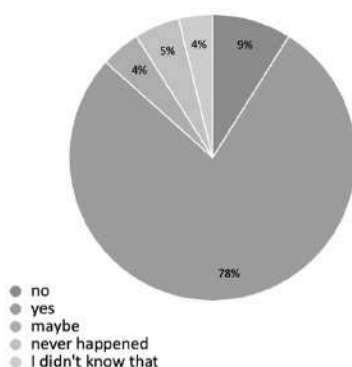


Figure 14. Faculty responses to the question 'Is communication with the "Counselling center" of the University or other support centres part of your job? Explain the reasons.'

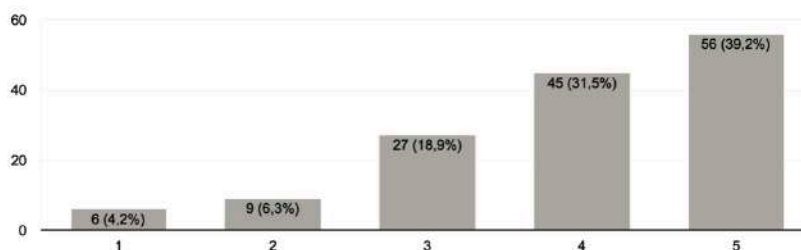


Figure 15. Faculty responses to the question 'In the case of a student with special learning needs (e.g., visual impairments) to what extent would you be willing to adapt your course to the needs of that student (e.g. implement individual lesson plans) (1=a little, 5=very much)'

As seen in Figure 14, most faculty are aware of the support center for the students with special needs (78%) and only a 9% answered that the communication with this center is not part of their job. There is also a small percentage (4%) that ignores the existence of this center. Additionally, 39.2% of the respondents are very willing to make changes to adapt their course to the student with special needs, 31.5% of them will make such changes while 18.9% of them will perhaps make some changes (Figure 15).

Following faculty responses, it is germane to consider elaborating on a holistic framework of inclusive education in higher education as part of their academic development. This may include ways for academics to collect information about the students' sociocultural backgrounds or different needs without making students uncomfortable, and ways of modifying their teaching and learning design so that it is inclusive of all students without labelling. Other equally important academic development needs include understanding the importance of adapting, modifying and monitoring teaching and learning methods, resources and tools in order to enhance access, engagement and facilitate progress of all students. Making concrete links between abstract conceptualisations of

differentiated learning and specific educational tools and practices may be one way of meeting this need. Another way of fostering academic development is collaboration of teaching and learning centres with counselling or support centres for students with additional or special needs so as to raise academic community awareness of classroom technologies that may enhance learning.

Digital awareness

Although some faculty are open to communicating with students through popular apps such as Slack and Viber (18%), a considerable number of Faculty (62%) do not use more than powerpoint, word, pdf and e-class platforms in their teaching (Figure 16). Of those, one third of the respondents uses the university educational platform to upload educational material (29%) as a repository and not as a means for increasing engagement, for learning or assessment (Figure 17). In the question “What digital tools do you use in your teaching besides word, pdf, PowerPoint, e-class?” the participants reported that they use the University’ Platform or another platform. Nevertheless, innovative practices were still apparent featuring a 15% percent using projects videos, 4% using questionnaires and a 4% including programming exercises.

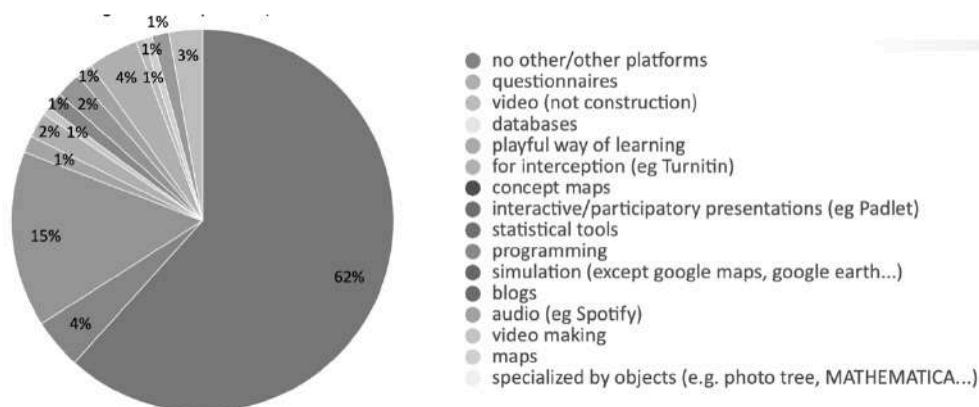


Figure 16. Faculty responses to the question ‘What digital tools do you use in your teaching besides word, pdf, PowerPoint, e-class?’

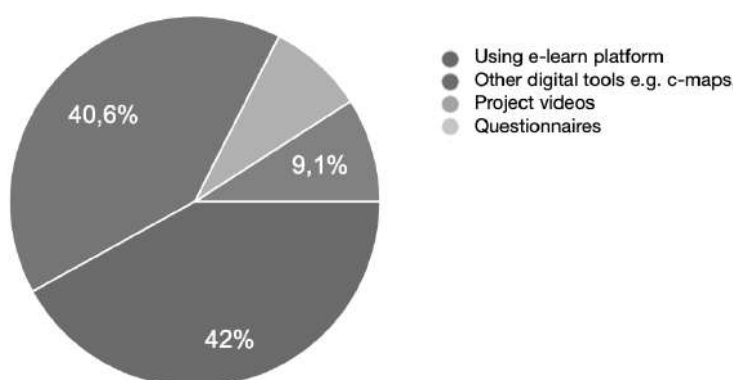


Figure 17. Faculty responses to the question ‘Comparing the current use of e-learn with the period of the corona virus when classes were held remotely, now do you...’

Regarding Faculty’s second and third choice of preferred digital tools (Figure 16), responses showed that almost 40% of Faculty have used alternative digital tools to create concept maps, interactive presentations, questionnaires, to name but a few. In Figure 17, 42% of the participants declared that they make the same use of the platform as they did before the pandemic, while 40,6%

of them reported that they use these educational tools less than before the pandemic. During that period, the platforms were the main educational tool. All in all, 8,4% of respondents reported using them more now, while 9,1 % of them opted for other platforms. Figures 18 and 19 show that other educational tools are used to identify similarity rates in writing (e.g. Turnitin), concept maps, interactive presentations (eg Padlet), statistical tools, simulation (google earth), blogs, audio (e.g. Spotify), or specialise discipline-specific apps (e.g. photodentro, MATHEMATICA...). However, the question remains as to whether Faculty invite students in using these tools as part of the learning process or to create new input.

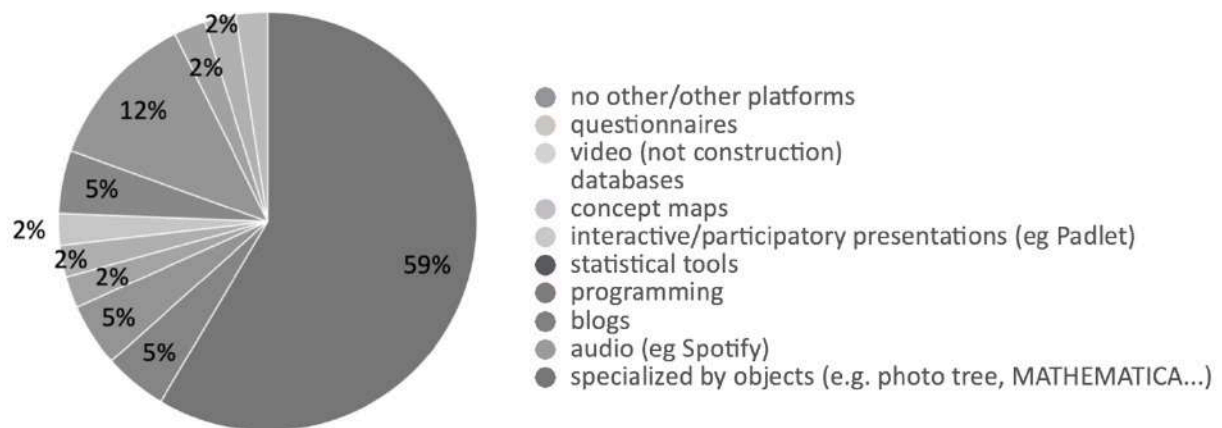


Figure 18. Faculty responses indicating second choice of digital tools

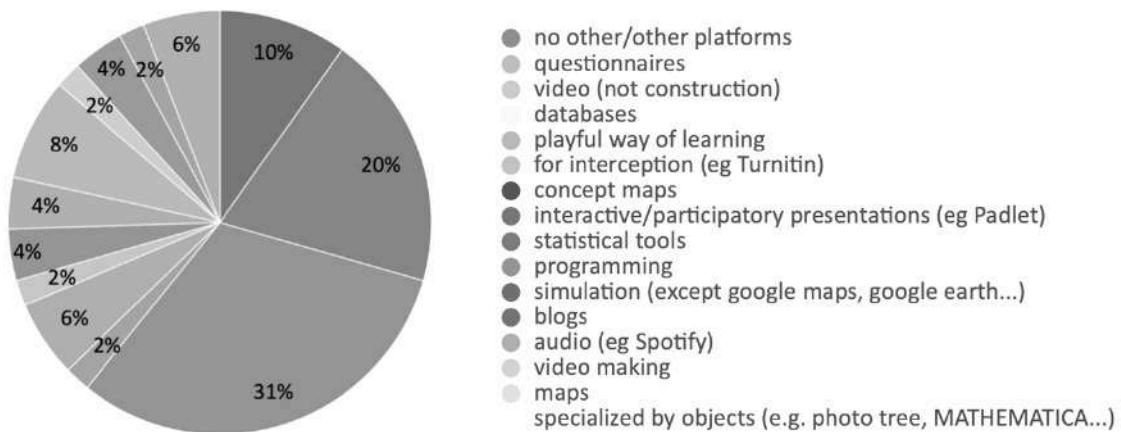


Figure 19. Faculty responses indicating third choice of digital tools

Based on the above responses, it is apparent that Faculty need to become aware of how they can use the university's platform not only as a repository of resources (i.e. articles) but also in order to increase student engagement and collaboration, as well as student agency and reflection (e.g. quiz, questionnaire, wikis). Another possible follow up action would be to raise awareness of blended or flipped approaches to learning and disseminate to all academic community members the benefits of enhancing communication through popular active learning apps as well as other innovative educational tools.

Digital equity (tools and multimodality)

Social networks use benefits the communication in higher education and provides the means to all stakeholders to participate actively in the learning process (Hung and Yuen, 2010; Van Waes et al., 2018). Nevertheless, the use of famous social networks is not evident in this sample (Figure 20).

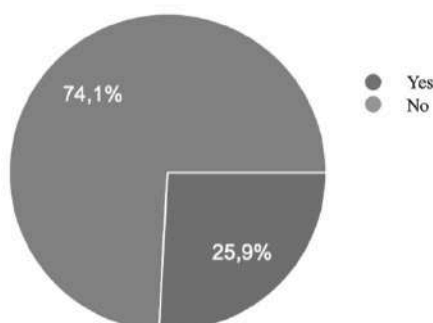


Figure 20. Faculty responses to the question 'Have you ever created a learning community with students and/or colleagues on a popular social network, such as Facebook, Instagram?'

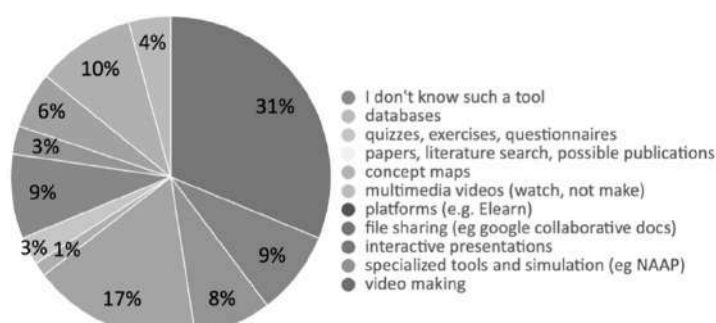


Figure 21. Faculty responses to the question 'Which digital tools do you think facilitate students' learning?'

Several problems emerged during the COVID19 period concerning mainly issues of digital equity (Selwyn and Jandrić, 2020), such as the use of phones instead for personal computers, the difficulties reading power point in a small screen, the poor internet connection or the use of one device by many/all family members. Nevertheless, the respondents did not report any such problems and they stated they did not observe any such significant problems during the COVID online education. Also, 13% and 11% of the respondents were very satisfied by the university services. However, as it is discernible in Figure 21, respondents could not always identify the tools that can promote students' knowledge, since in the question "Which digital tools do you think promote students' knowledge", 63% of them replied *all the previous tools*, meaning mainly the educational platform. Only 11% of them reported they are not aware of any such tools.

In fact, as shown in Figure 22, raising faculty awareness of digital tools that enhance teaching and learning seems appropriate especially when one third of the respondents stated they do not know of digital tools that allow students to become producers of knowledge; yet, 9% of them mentioned the use of platforms and 8% of them mentioned databases, quizzes, exercises, and questionnaires.



Figure 22. Faculty responses to the question 'Provide an example where the use of a digital tool enabled students to become producers of knowledge'.

Based on the above responses, prevalent academic development needs include raising faculty awareness of potential digital equity challenges students may face as well as informing faculty of the educational value of widespread use social networks and educational tools that promote students' knowledge not only in terms of engagement and assessment but also in terms of enabling students to become producers of knowledge (e.g. designing mind maps, programming, constructing videos -not watching).

Teaching and Research nexus

According to Figure 23, the vast majority of the Faculty in this research-led university acknowledge the compatibility of research and teaching in higher education.

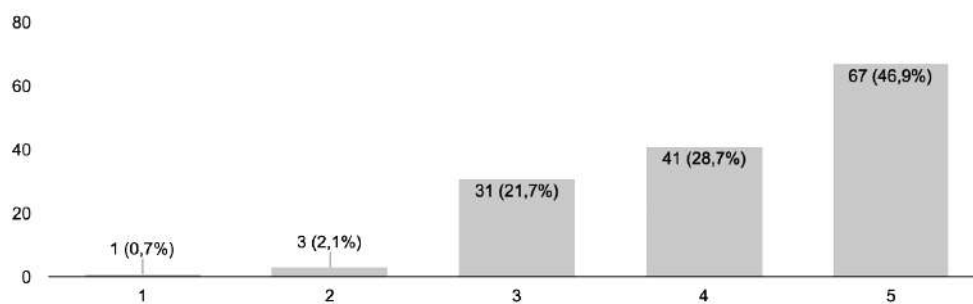


Figure 23. Faculty responses to the question 'The role of the academic is twofold as it entails teaching and research. How compatible are these two? (1=a little, 5=very much).

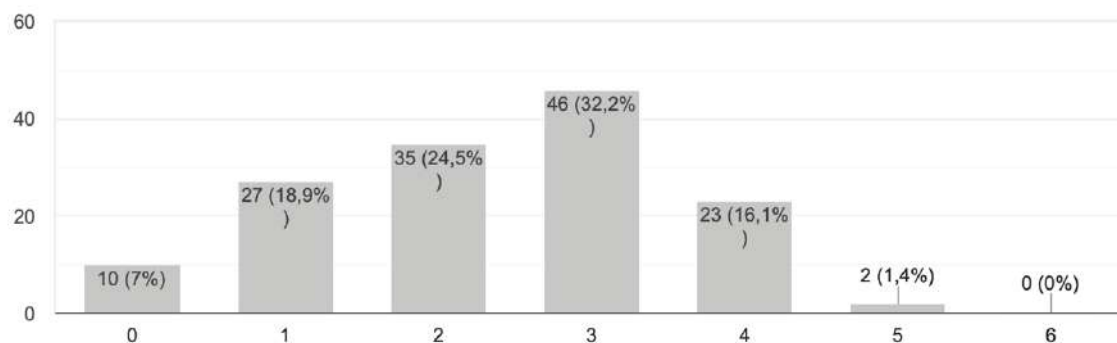


Figure 24. Faculty responses to the question 'To what extent do the students know your scientific work? (0=not at all, 1=a little, 5=very much)

However, this is not evident in the next question when most Faculty report that their students are not really aware of their research (Figure 24).

Nevertheless, teaching appears to be very important and is valued highly by the respondents; in a question asking respondents to choose between an outstanding researcher with questionable teaching practices and a successful teacher with limited research outputs, 43% of the participants opted for the better teacher and 21% opted for the researcher (Figure 25). Figure 26 shows that 61% of the respondents combine research with teaching by introducing new research in the course and only 12% of them stated this is not possible. Also, 4% of the respondents documented in their answer successful participatory methods such as action research, focus group, protocols of observation as a way to facilitate the connection between research and teaching.

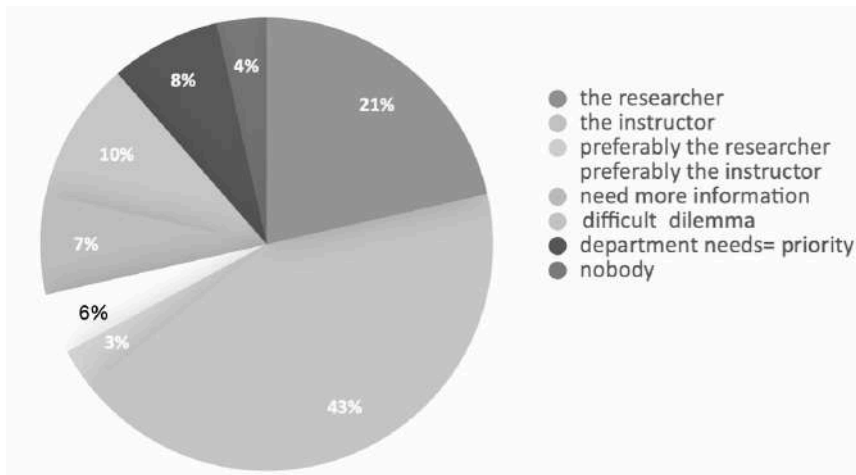


Figure 25. Faculty responses to the question 'You are discussing in your department the case of hiring a new colleague. One candidate has significant research work and many funded research programs, but his lesson plans are weak and sketchy. On the other hand, you have a colleague who has fewer research outputs but seems invested in teaching, up-to-date teaching materials, student-centred lesson plans and presents innovative teaching ideas. At the same time, the latter candidate is active in the local community and shows diverse educational and cultural activity. Which of the two candidate would you support?

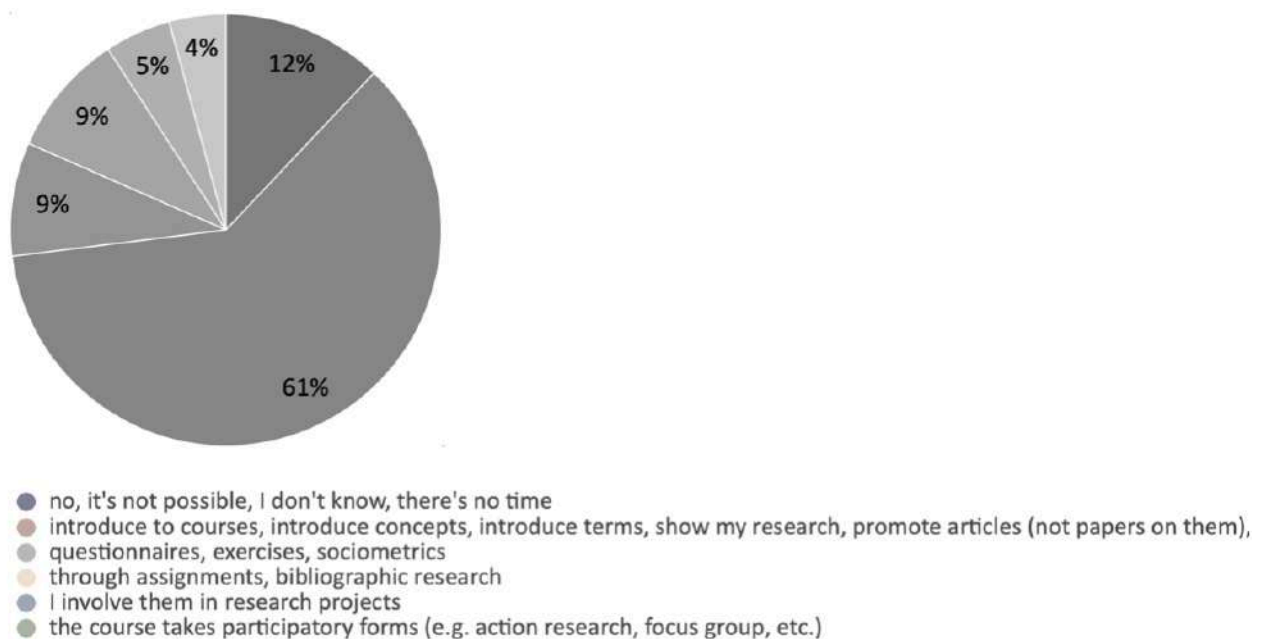


Figure 26. Faculty responses to the question 'Please list one practice you follow to combine research with your teaching'

Based on the above responses, it is evident that academic development can focus on identifying educational tools that render the connection between research and teaching more prominent through all aspects of teaching and learning (Gros et al., 2020), as well as participatory methodologies like action research to inform current teaching practices based on evidence based situated praxis (Katsarou and Tsafos, 2013).

Students-teacher communication

Figure 27 shows that 50% of respondents seems to ignore what a learning community is, yet they acknowledge different traits of a learning community such as knowledge and exchange of ideas (7%), the achievement of learning goals (14%) and interaction and sense of community (8%). Some respondents connected learning communities with students as equal partners, the connection with the society (returning the knowledge back) and constructive communication.

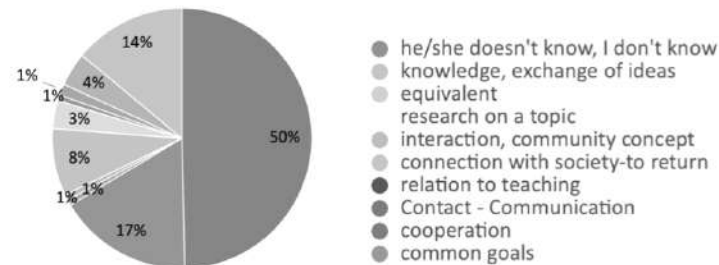


Figure 27. Faculty responses to the question 'What is a learning community?'

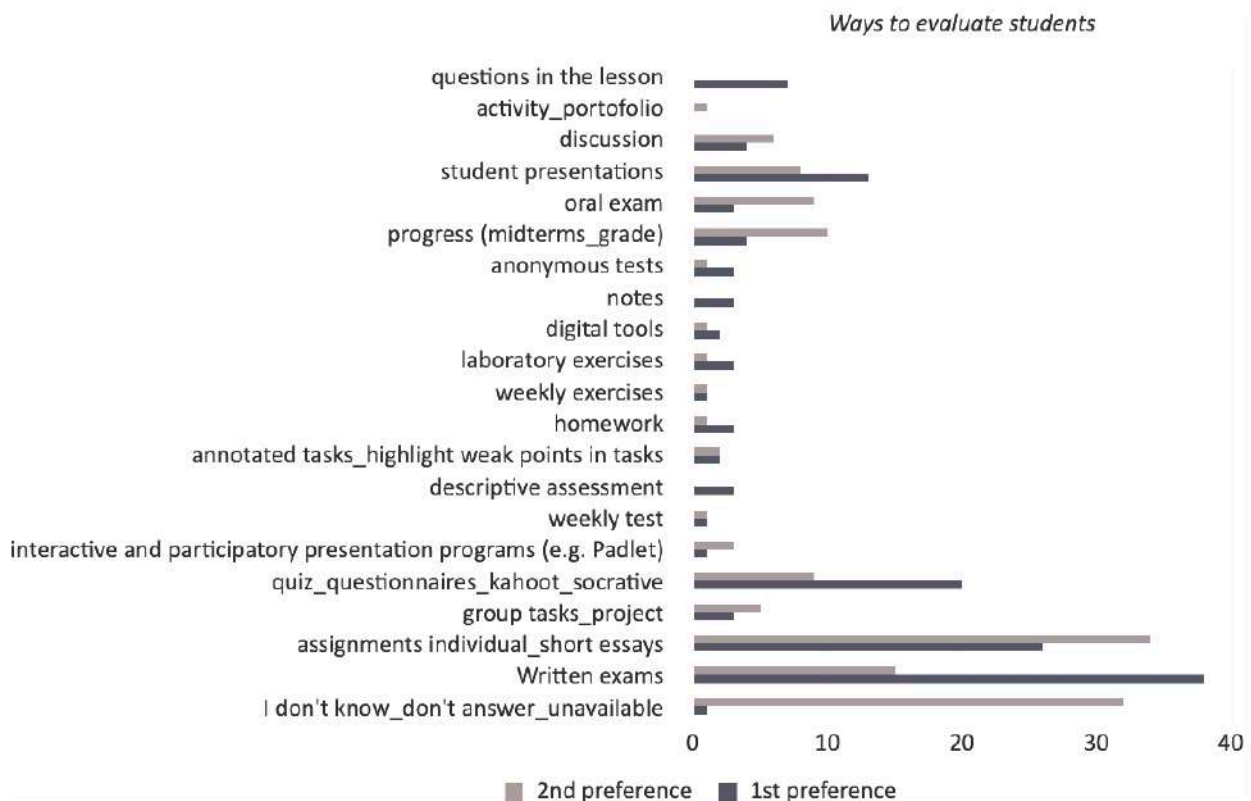
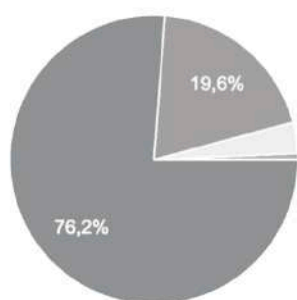


Figure 28. Faculty responses to the question 'Please list the three most successful ways of how you are communicating with your students.'

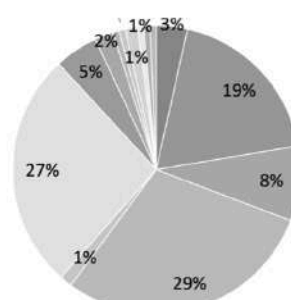
The most common ways of student-teacher communication is in-class communication (29%), office hours (27%) or email (19%). Additionally, in Figure 28 there are cases of distance communication between teachers and students via video conferences (8%) or learning management systems (platforms) (5%). Other ways of teacher-student communication include educational activities outside the class like field trips, city tours, excavations and excursions, active listening, use of apps

like WhatsApp, sharing instructors' personal telephone numbers, or creation of groups on Facebook. Other categories included groups and/or professional groups.



- Within 24 hours
- No later than three days
- No later than a month

Figure 29. Faculty responses to the question 'How quickly do you respond to messages sent to you by students?'



- I don't know
- mail
- office hours, meeting (simple reference) or video conference in the class
- actions outside the classroom -e.g. city tour, excursion, excavation
- personal contact, investment of time
- platform usage
- active listening
- use of a communication tool (e.g. Messenger, whatsapp)
- personal phone
- creating groups
- in the office at any time
- debate
- Work groups

Figure 30. Faculty responses to the question 'During the corona virus period, we distanced ourselves from contact with the students. List 2 ways in which you feel you have stayed in meaningful contact with them.'

In Figure 29, 76,2% of the Faculty reported responding to student email mail within 24 hours and 19,6% of them in the first three days. Also, Faculty communicates with ease through platforms such as Microsoft Teams, Zoom and Skype at 40% and via mail at 28% (Figure 30) while alternative ways such as Facebook, Instagram, forum, post material on e-learn (or some other website) and office hours for online communication were also evident. There were also cases faculty members adapted their educational material by providing more detailed instructions or supplementary notes.

Academic development needs that emerged from the above responses call for further clarification of the concept of learning communities and how they can be exploited to maximise the benefits of students centred learning while the Scholarship of *Students as Equal Partners* was almost negligent in participant responses. Also, academics need to become aware of how tangible ways community-based activities can increase the sense of belonging, and improve not only teacher-student relationships but also student-student relationships. This is in line with Lenning and Ebberts (1999) as this sense of connection within learning communities increases all members' sense of belonging, interdependence or reliance, faith, trust in each other or trust in the shared purpose of the community. Faculty also need to become aware of how they can enhance peer collaboration and communication, expand communicating channels (e.g., social networks, forums) and invest in organising activities involving all communities (community of practice, community of learning and discourse community).

Formative assessment and assessment for learning

Formative assessment was an evasive concept for most of the respondents as the terms evaluation and assessment require further disambiguation in Greek, which is participants' mother tongue. As indicated in Figure 31, half of the respondents (52%) stated they assess knowledge and check understanding, an 11% of them evaluate student critical ability and synthesis skills, while a 10% reported taking into account student effort and their will to learn.

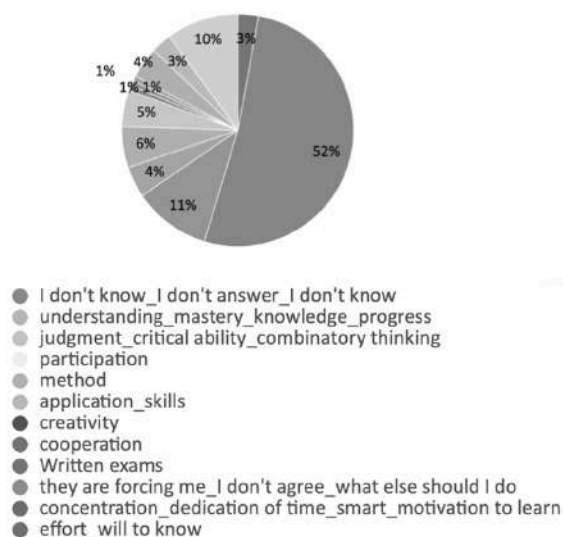


Figure 31. Faculty responses to the question 'What does your assessment focus on?'³⁰. Please list two student assessment methods/tools that you have used recently.

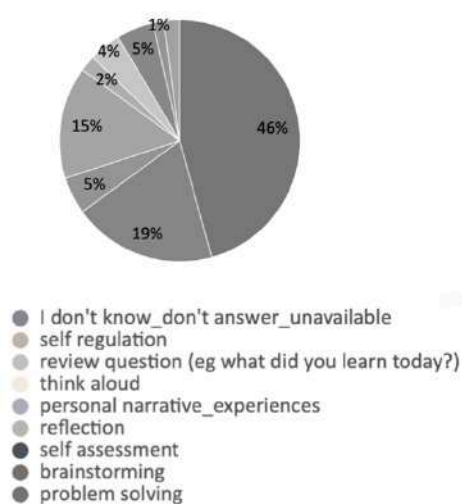


Figure 32. Faculty responses to the question 'The development of students' metacognitive skills enhances learning and motivates. What metacognitive practices (e.g., think aloud, self-regulation) do you use and why? When do you announce the assessment criteria for your course?'

Formative assessment was limited to under 6% in the form of creativity and cooperation. Another 4% stated that they do not agree with the assessment traditions but they are forced to follow them. Regarding the means respondents use to evaluate students, the most popular ones are written exams and the individual written essays. This finding is affirmed with the finding that the 52% evaluated student knowledge. As these methods are aiming in a most individualistic perspective of learning and teaching, its proponents possibly need to become aware of peer-to-peer, group, collaborative or reflective participatory learning and evaluation constructs that boost students' sense of metacognitive awareness, sense of self-efficacy, autonomy and possibly self-regulation (Zimmermann, 1995). Some respondents reported using interactive tools such as group tasks, interactive programs (e.g., Padlet), weekly tests, descriptive assessment, annotate tasks, laboratory exercises, digital tools, notes, the students' progress through middle evaluation, oral exams, discussions, and portfolio but overall the overall rate did not exceed the tendency for summative end-of-year exams or assignments. Interestingly, a large percentage reported they could not answer this question.

Metacognitive strategies are a key component of formative assessment as assessment for learning aims at making students' aware of their own strengths and weaknesses. Approximately half of the respondents did not know what metacognitive strategies were, yet it was not obvious for the researchers, if they were not aware of the terminology (Figure 32). One fifth of the respondents reported using self-regulation strategies but they did not mention which ones. The same applies with think aloud protocols (15%) which was provided as an example. Yet, less than 15% of

respondents overall stated reflection, self-assessment, brain storming and asking students to review parts of the course by answering a question such as “What did you learn today?”.

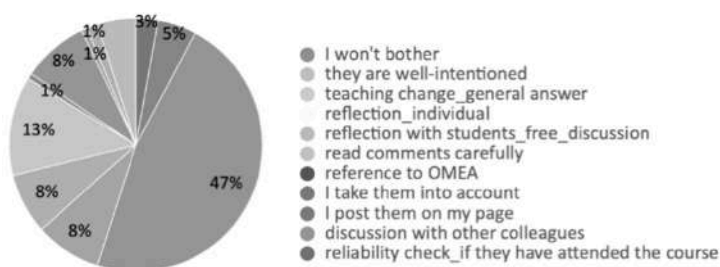


Figure 33. Faculty responses to the question 'Suppose you have collected anonymous questionnaires from students recording negative comments about your teaching. What do you do?'

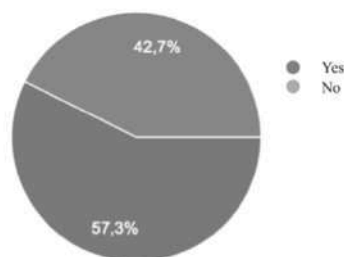


Figure 34. Faculty responses to the question 'Suppose you have collected anonymous questionnaires recording negative comments about your teaching. Do you share them with your students?'

Student evaluation questionnaires are a valuable tool for academic development as they are indicative of student voice. In Figure 33, 47% of the participants reported they would make a change regarding their teaching in case of negative comments in their evaluation reports (without providing more details), yet in their responses there are more dynamic perspectives that can lead to changes. For instance, in the same question, 8% proceeds to individual reflection, while another 8% proceeds to reflection with the students. Also, almost two thirds of respondents (57,3%) share with their students the negative comments they have received, while 42,7% does not (Figure 34).

Based on the above results, it is evident that some faculty members understand the value of formative assessment and assessment for learning, yet they may need to become aware of learning theories that are not based on knowledge assimilation; based on constructivism theories, knowledge is not only individually constructed but also socially constructed through pair, group or social interactions and collaborations. As such, student engagement and agency does not only aim at increasing understanding but it may also foster higher order cognitive skills (Bloom's Taxonomy). Faculty may also need to become aware of ways of measuring these cognitive skills through formative assessment and ways of facilitating student metacognitive awareness and self-regulation through assessment for learning activities. They may also need to know how they can create opportunities for their students so that the latter can take part in the decision making of their curriculum or assessment *as equal partners*. Creating reflective and participatory learning communities that provide feedback to all stakeholders can embrace reflection as means of enhancing student-centred learning and teaching environments and curricula.

Curriculum Development (alignment between goals, outcomes and student needs)

Curriculum development as mentioned earlier mainly focuses on the constructive alignment between goals and learning outcomes (Biggs, 1996); what is examined herein is respondents' intuition to adapt to student recurring needs and whether they involve students as equal partners in this process. As such, it is very important that the students are informed about the expected results since they have the time to understand the aim and the scope of each course and work toward meeting learning outcomes. The vast majority of respondents stated that course criteria are announced in the beginning of the semester (74%), thus acknowledging the importance of clarifying

to the students the goal and outcomes from the beginning and stressing their importance for the learning and teaching activities.

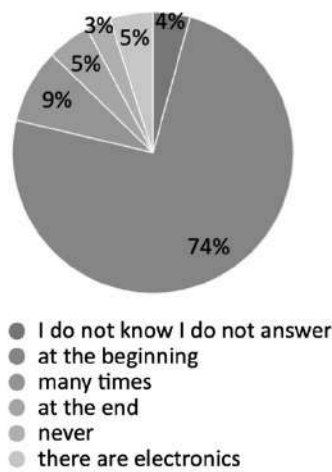


Figure 35. Faculty responses to the question 'When do you announce the assessment criteria for your course?'.

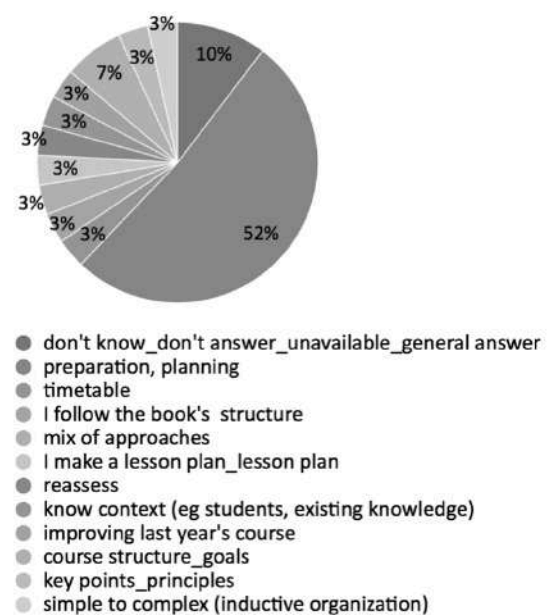


Figure 36. Faculty responses to the question 'What do you do so that your lesson is well structured?'

Figure 36 shows that Faculty reported preparing for their courses but only few of them reported drafting a lesson plan. Also, there is a 10% that responded 'I do not know' or added an answer that does not correspond to the question.

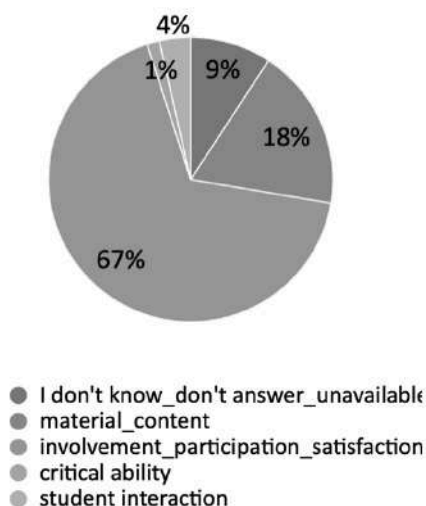


Figure 37. Faculty responses to the question 'What does an instructor consider when evaluating their teaching?'

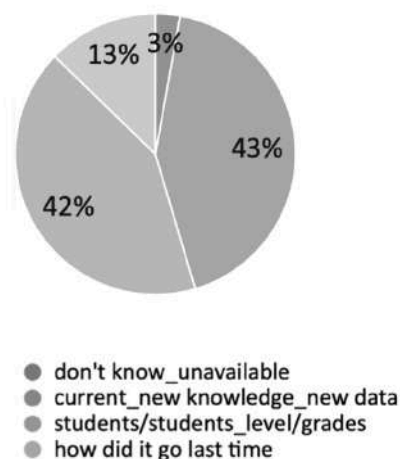


Figure 38. Faculty responses to the question 'What are the criteria according to which you adapt your courses?'

Regarding elements that they take into account in their student evaluation, 67% responded that they take into account student involvement, participation, and satisfaction (Figure 37). It is important that academics acknowledge these skills instead of focusing only on knowledge of educational content. Nevertheless, some respondents are focusing on the content and they are not using participatory approaches. What is more, the criteria according to which respondents rearrange their courses are mainly based on student performance (i.e. grades) (42%). Another 42% stated that new knowledge and data in the field are also important; yet, this implies a focus on student summative knowledge and performance. Only 13% of respondents adapt upon reflecting on how their lesson went the previous time (Figure 38). The majority of faculty reported that they adapt their lessons/ courses every semester (42%) or every year (24,5%) (Figure 39).

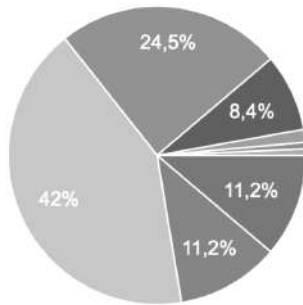


Figure 39. Faculty responses to the question ‘How often do you make changes in your course?’

Emerging academic development needs that became apparent regarding the curriculum development axis and its constructive alignment according to student needs called for the need to for Faculty to become aware how important this alignment is regarding student engagement, scaffolding and progress. Another critical point is to raise faculty awareness of the value of lesson planning not just regarding presentation modes or content (and new research) but also engagement (participatory educational tools) and formative assessment (depending on students’ needs not just instructor priorities). In this context, fostering students’ metacognitive skills can be a priority as it is conducive to student self-regulation and autonomy.

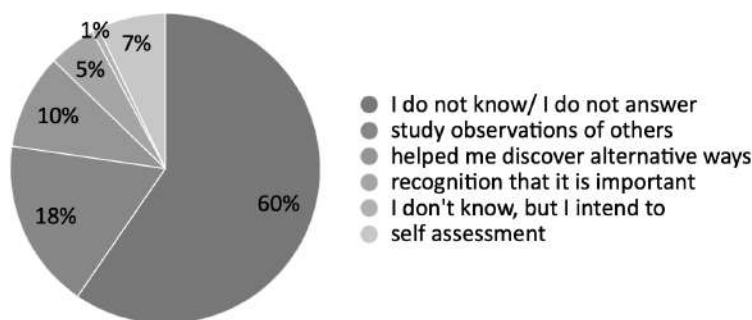


Figure 40. Faculty responses to the question ‘How would you use a protocol for observing your teaching? What did/would you gain from observing the teaching practice of your colleagues in action?’

Faculty’s stance towards innovative academic development tools such as collaborative peer-observation of classroom teaching was examined (Figure 40) showing that 59% of the respondents were not aware of this academic development method while 18% recognised that these protocols are used to observe others in order to improve teaching practices but they did not elaborate in their

answers. Yet, it was not clear from their responses, if they associate peer-observation with assessment of quality teaching or as an academic development tool that allows the observer to reflect and as such improve their one teaching practices (Tenenberg, 2016).

Critical insights from questionnaire data

Based on the aforementioned data, alignment of Teaching and Learning Nexus is not fully compatible with Faculty practices (Neumann, 1996). Also, university teaching and learning still focuses heavily on content dissemination or performance-based knowledge acquisition and not on the students' agency and interactions. With students' experiences and sociocultural factors being excluded, monologues still prevail despite the importance of dialogue in student-student interactions or teacher-student interactions (Jensen and Bennett, 2016). Innovative practices are evident but they are not widespread; as such, dissemination of existing good practices through participatory reflective peer-discussions could be included in future academic development interventions. It is important that the majority (74%) of Faculty announce course criteria in the beginning of the course and the majority of faculty recognises the importance of course preparation. Yet, Faculty need to realise that a university classroom constitutes a community of learning and as such faculty needs to become aware of how they can constructively align all course components via adequate lesson planning that allows evaluation of student engagement and agency as well as student reflection and agency (Katsampoxaki-Hodgetts, 2022). Faculty also need to become aware of how they can adapt their lessons according to students' needs by implementing innovative digital tools, in which the students act as producers and not only as consumers of knowledge. Regarding digital equity, as challenges were not identified by the respondents (Gounari, 2009; Selwyn and Jandrić, 2020), faculty needs to become aware of socio-economic or other barriers that may prevent synchronous online access and make necessary modifications to render their courses more inclusive. As well as digital equity, other aspects that were not fully explored in this dataset concern academics' stance towards students' contribution in the decision making processes and students evaluating and co-designing curricula, yet responses indicated that a very small number of faculty is willing to consider such processes.

4.2 Interview results and discussion

Student-oriented learning

As far as student-oriented learning is concerned, 62,5% of the faculty members say that their teaching and educational material correspond to the students' needs, as they try to learn about their students' social background. As expected from the sample, 100% of the faculty considers students' active participation and full engagement as the best practice for a student-centred learning in conjunction with small groups such as in seminars and laboratory work.

E2: *...I think that student-centred learning has to do with students being active throughout the whole course ...*

E15: *How can learning not be student-centred?... there should be an interaction... conversation and not just the educator talking...*

The majority of faculty (75%) implements what we quote "progressive learning" (E1) by using experiential learning, interactive learning, offering of feedback, flipped classroom, dialogue, democratic learning, differentiated assessment and brainstorming, in order to promote student-centred learning. There are also digital means used, as videos, songs, photography, and short-length movies by more than half of the faculty (75%). These means are mentioned as practical ways that

engage students in teaching activities, as they are more likely to interest students compared to teacher-centred teaching methods, like the educator's monologue. The faculty members seem ready to utilise whatever keeps the students engaged for as long as possible.

Despite all the above-mentioned student-centred ways of teaching, the monologue dominates university teaching. More than half of the interviewees say, "*lecturing is all we've ever known*" and the other half says that "*we haven't been taught to teach otherwise*", "*it's convenient, easier, safer*", "*we can manage our time in class and how much of the material we can deliver*", "*it is the ideal way for the specific field*" (mainly Medicine and Sciences). On the other hand, 43,7% of the respondents rejects monologue (at least in their rhetoric) and attribute its popularity to lack of awareness, lack of taking initiative to further explore other teaching methods (31,2%) or due to practical difficulties (31,2%) as there is not sufficient space nor staff to accommodate smaller groups

Emerging Academic Development Needs regarding the first axis:

- Prevalent needs emerging from respondents' insights so far indicate that the need for further academic development activities that increase faculty awareness of active learning and student-centred teaching strategies, other than monologue. In the same line, academic development could facilitate faculty 1
- learning how to use means productively to promote student-centred learning. Other needs that seem to emerge from the responses is infrastructure changes relevant to student-centred classroom architecture and recruitment of
- more faculty members.

Inclusive education

The groups that inclusive education has to focus on, as mentioned in the interviews, were students with special learning difficulties such as dyslexia, autism, ADHD, students with disabilities, autoimmune or chronic diseases, working students, economically disadvantaged students, of senior age, parents and differently sexually oriented. A staggering 81,2% say they're willing to differentiate their teaching by providing alternatives in the way the students will be assessed. They offer differentiated teaching through differentiated assessment (oral exams, selection of topics), access to digitalized material or offer to teach or share notes in English (18%) and personalised teaching through feedback videos. So, they seem to be familiar with the concept of heterogeneity of student population and the need for inclusive education. Also, they seem to understand the importance of differentiated student assessment. There was only 1 out of 16 interviewees who said they do not do much as the audience is homogeneous in the class.

E1: Of course, I think that inclusion is achieved with differentiated teaching ... as well as with differentiated assessment.

E10: We hold special exams... it can be oral; it can be an exam at my office or anything...

A considerable number of respondents (43,75%) considers certain skills as really important such as empathy, acceptance, encouragement, reward and active listening, and along with other techniques and means, these are said to promote inclusive learning. These include: the mapping of the students' needs, interests and learning profiles and then using brainstorming, debates, projects, experiential learning, and teamwork.

More than half of the interviewees (62,5%) state that they are available for a private meeting during office hours or right after class or via mail and ready to seek for some advice from University's Advisory Center. Most respondents are aware of the university's support center for the students with special needs (62,5%).

E7: ... I tell them I am available via mail, phone and at the office. "You can bother me any time... my office is open"

Although the faculty appears to be aware of the need for inclusive education and differentiated teaching, the data from the questionnaire showed that almost half of them do not apply such principles in practice. The interviewees attribute this to every educator's personal teaching theory which has been formed year by year through their experiences (43,75%). *E1: ... when the educator's personal theory is all about giving a lecture... it is very likely that they won't have moved on* Half of them also admits that universities promote research at the expense of teaching when it comes to a member's career promotion. Also, their workload is said to be so heavy that they neglect differentiated teaching and finally a quarter of the interviewees hold the students accountable for not embracing inclusive student-centred pedagogies due to lack of experience in secondary education; as a result, faculty do not implement such strategies because students are not responsive.

Emerging Academic Development Needs regarding the second axis:

As they were mentioned through suggestions by the interviewees themselves:

- Raising faculty awareness regarding the accessibility of students with special needs, especially of students with mobility disabilities
- Raising faculty awareness regarding Teaching Methodology with lectures on inclusive teaching to support change of the routine
- Timely notification by the university support center so that they can plan their curriculum. Faculty members need to know which students need differentiated teaching and assessment from the very beginning of the semester and not just right before the exams.
- Provision by the policy developers of a personal assistant for certain students that need help
- Improvement of the building infrastructure so as to cover the students' needs

Digital awareness

Respondents seem to be using a great variety of digital tools. The interviews data showed a great use of the University's platform (43,75%) which is taken almost for granted since the faculty considers it to be user-friendly, effective, safe and a means through which the students can be reached (43,75%). Its use is not limited to uploading educational material, but -in some cases- it is also used for communication, feedback, task assignment and chat (12,5%).

All faculty members use computers, the internet, emails, powerpoint, mobile phones and social media. There is a very wide variety of digital means mentioned, such as Google Document, Google class, Utube(the use of video rises to 75% (12/16), audio (e.g. Spotify, podcasts), platforms (Skype, Zoom), data bases, apps, online simulation tools (e.g. PhETColorado, virtual anatomy), Socrative polls (at 12,5%), interactive presentations (e.g. padlet), c- maps and specialised object tools such as Perseus and TLG. Occasionally, they use tools like Turnitin to boost academic integrity.

All educators use one means or another, so overall they appear to possess digital readiness. The 43,75% of the interviewees argue that there is no issue of digital literacy on their behalf but of the students especially in the first semester of their studies. They also mention that students face

literacy challenges in general. However, there is a 12,5% that dislikes online teaching and admits their inability to handle digital tools, despite the seminars they have attended.

E4: For me, it's obviously my inadequacy...if I had the skill and possibility to devote time, it may have been more interesting for the students...

Emerging Academic Development Needs regarding the third axis:

- Provision of digital literacy courses as an integral part of the curriculum (in a Computer Lab for students)
- Seminars on the use of different digital tools to disseminate knowledge to other faculty members and make it less time consuming for them to learn
- Personalised seminars for specific needs of the educators
- Make the platform easier to use on the mobile phone, since everybody owns one and it is often used as an educational tool in class.

Digital equity

Digital equity is a “social justice goal” (Resta et al., 2018; 2). Digitalisation can promote inclusion as the educational material is easily accessible to everybody. However, access should not be taken for granted. Exclusion from accessing certain educational tools, from knowing how to handle such tools or sharing information in one's mother tongue leads to digital divide (Soomro et al., 2020). However, the discussion in Tertiary Education focuses not on accessing tools and information but what people achieve in various levels through them, that is how they themselves can produce knowledge (Resta et al., 2018).

The majority of the interviewees (75%) reported digital equity did not constitute a challenge for anyone and that the material was accessible during the pandemic when online teaching was imposed since everyone had and has a mobile phone these days.

E9: Now, if you tell me that somebody doesn't have the possibility to own a device with internet access, OK, I don't think that there are such cases...

There were 3/16 (18,75%) interviewees that admitted that the mobile phone may not be suitable for specific fields and that it is a last resort to connect online, if not at all. Also 37,5% admitted that they received relevant complaints from the students (not stable connection, weak equipment, etc). They state (81,25%, 13/16) that they did not do much to overcome any difficulties that arose, because the university supported them (offered them technical support) and assisted the students by offering free WiFi and Computer Labs for the ones that did not afford to buy a computer. As reported, the university even provided some students with laptops during the Covid-19 (on loan).

E11: ...during the pandemic we had received some student complaints... we gave a practical solution...There were some spare mobile phones, some laptops... we gave them to those students who really did not have access..

Emerging Academic Development Needs regarding the fourth axis:

- Raising faculty awareness of how students can produce knowledge through digital means
- Providing strong equipment and support to students as well as to the educators
- Raising faculty awareness of digital equity issues that exist when it comes to students' accessibility and use of platforms. Some platforms do not run well on mobile phones, which is all some students have.

Teaching and Research nexus

Faculty members seem to recognize their dual academic role, including both the teaching and the research. This is evident in the interviews, since 87,5% state that they connect research to their teaching through a variety of practices: by introducing case studies, research projects, focus groups, interviews, simulation, and debate, by having the students research the course itself throughout the semester observing participation and asking them write in class what they would do in various hypothetical scenarios (in Medicine) using their knowledge and critical thinking. Some of the faculty combine theory with data from their own research (18,7%).

E11: They have to carry out a small research project... they have to go to the research field, collect data and we guide them how to analyze them and how to write a research report or an article or whatever...

However, a small percentage (12,5%) reported they cannot combine teaching and research. They argue that there is indeed research carried out in labs but it cannot be connected to the specific courses, as research is highly specialised and the BA students' level of knowledge is rather poor (31,25%). Another reason why it is difficult (25%) to connect the two pillars is that the curriculum structure and content does not allow it. Thus, they say (43.7%) it depends on the field of study.

E9: ...it's not always so easy... when the research is too focused... not applicable to what they are taught... when it's too specialised...

Emerging Academic Development Needs regarding the fifth axis:

-Academic development courses need to render the connection between research and teaching more tangible through participatory methodologies (by students' participation in simple research projects).

-to connect teaching and learning with small-scale research conducted in the context of a semester-long on-campus course (e.g. with interviews of students or faculty or questionnaires).

Students as equal partners

Interviewees state that students can be treated as equal partners (at 81,2%) and some even go further as to say that they are equal partners, since they belong to the academic community (18,7%). They also mention various ways through which they treat them as equal partners, such as engaging them in discussions about the curriculum, supporting them to be active in making decisions in class and co-producing knowledge (43,75%) using a variety of tools (e.g. video, platforms, google forms, Tux- painting, Kidsinspiration, padlet) and encouraging students to form clubs of interest (68,7%). They give them the chance to teach (12,5%) and present their projects in conferences (12,5%).

E3: "Equals", I don't think we see them in any other way...we always discuss the curriculum with them...try to improve or avoid tragic mistakes for the next year...

E8: ...we encourage them write papers with us and present them in conferences, then they become partners...

However, there is a percentage (37,5%) claiming that students could be equal partners, should the context allow it; this is not often possible due to the structure of the curriculum and the culture both of the students, (some of whom are said to be immature, indifferent, disrespectful and are not used to taking initiatives) and of the teachers, who also need to change their mindset and find time to devote in order to learn and use other types of teaching practices.

E5: ... this “equal” thing ... I think it’s not in their mindset... they [the students] come from a very protective environment, they don’t take initiatives and they don’t feel so equal to the educators as to demand or give voice to their needs...

A 43,7% attributes the faculty’s ignorance of educational means -through which the students can produce knowledge to their teaching culture, their heavy workload, and the way the course is carried out in amphitheatres with overwhelming number of student audiences. They also support that the students cannot be equal partners by definition, since there is an authority in the class, that of the teacher.

Emerging Academic Development Needs regarding the sixth axis:

- Faculty need to become aware of strategies that promote equal collaboration and communication in class
- Faculty need to become aware of how to cultivate the culture that students can produce or contribute to new knowledge
- Faculty need to be engaged in activities that create opportunities for the students to take initiatives

Formative assessment

Embracing student-centred pedagogies suggests that formative assessment should be geared around assessment *for* learning and provision of adequate feedback throughout the teaching process.

However, many educators are usually confused and think of formative assessment as summative assessment which evaluates knowledge, and it is usually held at the end of a course (Gipps, 1994). That is why the voice of the educators was important to see why this happens.

Half of the interviewees (50%) state that they evaluate their students continuously during the whole semester both in lectures and seminars, even if the word “assessment” is not mentioned. They claim to evaluate their overall attendance: their engagement, participation, performance, written projects, teamwork, middle exams and final exams. They also claim to assess them through the questions they ask and how they use their combinatory thinking when answering.

As for the tools the educators use for assessment, these most commonly include written final exams as well as middle exams, weekly assignments, and on-the-spot tests. Less common are group projects, discussions and observation with the educator taking down notes of the students’ performance. There was no mention of observation protocols, yet there was one faculty member that stated that in his/her department they observe and take down notes of their students’ overall performance as well as group work during the course. And they do so because they want to promote students’ interests and their critical thinking, without them having the fear of being evaluated. This helps them provide feedback to the students and reflect upon their own teaching methods.

Faculty seems willing to differentiate the assessment (87,5%) carrying out both oral and written exams and by providing a variety of assessment means. The reason the faculty use differentiated assessment and various means is to make sure the evaluation is fair and inclusive. Also, in the case of large audiences, to make sure that the product of the evaluation (i.e. a paper the students submit) is actually theirs and lastly to help students manage the course material they have to study.

E9: ...but I don’t examine them just orally as it may be thought as unfair subjectively...so written exams is necessary to put words on paper...

This finding aligns with the faculty's perceptions that the more ways they use to evaluate, the better the students show what they know, since they are given the opportunity to express themselves freely in every way it suits them. Formative assessment is used as a means for inclusive learning by the faculty in this sense.

Reflection is mentioned by 31,2% of the interviewees and it is often achieved during formative assessment. The educators reflect upon their teaching and the students' progress. There are questionnaires provided by the University Quality Assurance Committee and which students have to fill in at the end of each course to evaluate it. These are taken into account by academics and help them with their reflection. However, in the cases that the students do not log on to fill in the questionnaires, some members of the faculty have created and shared their own (more detailed) questionnaires. They use the results to change what does not work for the students, such as their strategy or something related to the course structure.

E8: ... *in formative assessment the most important... is reflection. It is unthinkable not to reflect as educators. Inconceivable...*

According to the questionnaire data (citation), there is a percentage that does not mention assessment for learning but consider assessment as a means to give a pass or a fail mark and/or punish those students that have not studied much. The faculty explains (at 68,7%) that they may have this wrong impression about assessment as it is connected with feelings of stress and the perception of punishment. The personal experiences are very strong since this is how almost everyone has been assessed so far

E10:... *because we know assessment as judgment not a way to learn, this is the reality...*

E8: ... *the whole thing starts with the fear of being assessed from the Ministry, as they use it as punishment...*

Emerging Academic Development Needs regarding the seventh axis:

- Faculty members stress their need to understand the meaning of formative assessment
- Academic development courses should render the connection between formative assessment, assessment for learning and engaging and interactive tools
- Faculty members need to understand the value of listening to the students' commentary and use it for reflection

Curriculum Development

In this category, we were interested in finding out about the educators' criteria on how they restructure the curriculum of their courses and whether they align the goals to their students' needs.

The faculty members seem to consider the adaptation of the course content and educational material as a priority, at a high percentage (75%) overall. They adapt it according to new research data, new knowledge, and literature wherever possible at 62,5% and less according to the students' needs, interests, current affairs, and daily life (at 37,5%). They adapt their lesson planning to include goal setting, teaching practices that initiate active participation and engagement, assessment, and reflection at 37,5% as well.

Half of the faculty state that they (as a department) reform the curriculum every year or every time a new member of faculty is recruited as they enrich the curriculum with new goals.

What really deserves to be mentioned is that the interviewees take seriously into account the feedback from their students and the 68,75% of them is ready to change the curriculum based on it, which perhaps means that reflection practices are embraced by faculty.

Emerging Academic Development Needs regarding the eighth axis:

- Academic development courses should bring to the forefront practical issues confronted in class
- Rotation of courses so that different educators teach them every semester
- Peer-observation in classes and feedback on teaching
- Incorporate flexibility in the curriculum and tools that engage students into learning. Their learning should be the main criterion for any curriculum reform.

5. Discussion and Conclusion

As for our first research question, “What are the perceptions and practices of the teaching faculty concerning these 8 axes”, the data showed that most academics connect their teaching with the students’ needs but what they pay attention to more is still **the content** of their teaching which restricts them to monologue, still the most popular teaching method. The content also guides them, up to a point, towards any curriculum reform. This is partly due to restrictions because of the curriculum structure and partly because this is how their perceptions have formed through their experiences. However, they rate students’ engagement and active participation very high. As for inclusive learning the faculty with sensitivity and empathy, receiving support from the university Advisory Center when necessary, are willing to differentiate both their teaching and assessment. But we have to mention that most of them seem to ignore the social framework of it and focus more on disabilities and learning difficulties. Digital tools contribute to inclusion since learning can be accessed easily and knowledge can be disseminated broadly. Faculty seems to be connecting research to their teaching proving right the literature (e.g. Brew,1995; Hortaetal., 2012) that finds a multi-level relation between these two. As for partnerships with students, the faculty is open to provide opportunities for equal collaboration, communication, and initiatives on behalf of the students so they can co-produce knowledge.

As for the second research question, “What are the needs of the teaching staff towards improving their teaching”, we can see that their needs are mostly focused on academic development opportunities regarding teaching practices and methodology, concepts of inclusive learning, differentiated learning, formative assessment and tools that can produce knowledge when used by the students. Academic development opportunities can also focus on the use of digital tools is also asked for by few, that will help them deal with everyday practical challenges in class. The educators need to have practical support so that they can apply the teaching principles discussed, combining them with their expertise on their field. Finally, they also need more time to devote on teaching, as administrative work takes a lot of their time.

We would selectively say that our subjects seem to oscillate between tradition and new directions and perspectives, in a context full of obstacles and opportunities. Hopefully, Higher Education Policy makers and Faculty could jointly consider the Reference Framework of Competences for Democratic Culture (RFCDC, 2020) in Higher Education and use it as a guideline to construct National Competence Frameworks for Faculty that facilitate contemporary student-centred learning and teaching environments. Also, in collaboration with faculty, future academic development initiatives can empower academics to improve routines to which the faculty members have been

accustomed to for years and support them in their effort to face the contemporary challenges of Higher Education.

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12. Digital Storytelling in Action Research: teachers' challenges in supporting refugee and migrant students for their inclusion

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Abstract. This paper presents a part of the research focused on Digital Storytelling implementation in Action Research addressed to culturally and linguistically diverse (CLD) students. One of the research steps was collecting qualitative data through online semi-structured interviews addressed to educators (n=12) with teaching experience to CLD students.

The data analysis showed that educational digital tools enhance the students' learning outcomes, motivation and levels of enjoyment. Nonetheless, the digital tools' implementation presupposes a series of prerequisites, such as the educators' expertise, students' active involvement, participation, and the technological equipment's availability. Digital Storytelling proved to be a valuable medium that promoted learners' skills (i.e. multimodality-digital literacy, interpersonal and collaboration skills) and reinforced their belongingness and resilience. Furthermore, a potential space for co-teaching between the class teacher and the ICTs teacher emerged considering that there is teaching roles' segregation and collaboration-communication among educators.

Keywords. *Digital Storytelling (DST), culturally and linguistically diverse (CLD) students, teachers' challenges*

1. Introduction

1.1. Inclusive Education

Inclusive education aims to remove all barriers that impede the participation of individuals regardless of their differences (Sukinah et al. 2018, cited in Soufarapi, 2022). In essence, schools that aim for inclusion do not require students to adapt to the school system; on the contrary, schools adapt to meet the diverse needs of all children (Evangelou & Moula, 2016).

Furthermore, inclusive education falls within the boundaries of intercultural education as it seeks to respond effectively to the exclusion of groups which are historically marginalized, such as refugees, immigrants and Roma through the counter-proposal of a peaceful coexistence that presumes cooperation and effective interaction between cultures (Palaiologou & Evangelou, 2011). In learning institutions, inclusive education considers any form of heterogeneity to be an enrichment of the learning process and, hence, suggests the reinforcement of various teaching strategies that respond to diverse learners as well as aims at building knowledge and negotiating identities (Candeli 2019).

To ensure that all pupils with a migrant or refugee background are given equal access to mainstream education, two new types of reception classes have been introduced in Greece over the last years: a) DYEP classes (Refugee Reception and Education Structures) that are coordinated to prepare all school-age children (4 to 15 years) to attend the mainstream school through afternoon subjects including the Greek language, b) ZEP (Educational Priority Zones) operate within the mainstream school, parallel to regular classes as a type of differentiated intervention (Marinopoulou, 2018).

In the frame of the HORIZON MICREATE project, the study of Palaiologou et al. (2021) indicates that the refugee students' gradual integration through the steps of DYEP from reception classes to full-time mainstream education could be a good step under certain conditions. Furthermore, Palaiologou and Prekate's (2023) study points out that formal mainstream education attendance -for children from disadvantaged socio-economical backgrounds, such as refugees-is necessary for building friendships with local communities. Because it is still insufficient, specific interventions must be established to create an inclusive school environment.

1.2 Digital Storytelling (DST) in the Language Education of Refugees and Migrants

As a powerful tool for communication and exchange of knowledge, values and experiences, Storytelling has been used diachronically. Its exploitation through digital means known as Digital Storytelling (DST), in contemporary diverse classrooms could contribute towards the emotional and linguistic development of migrant and refugee students. The exploitation of Digital Storytelling (DST) possesses a transformative impact on groups which are marginalized, converting them into heroes in their learning adventures, distracting their focus from the learning stress and shifting it towards the creative side of the endeavour. According to Pierrakou (2021), by allowing for differing interpretations of the same story that usually revolves around events related to globalisation, differences in civilisation or even racial racism, DST could serve as a bridge between cultures. Story creators with refugee or migrant backgrounds tend to communicate their thoughts indirectly through their stories to stimulate their classmates' interest and gain the empathy regarding upsetting situations. Hamilton et al. (2019) suggest that non-linguistic learning methods encourage deep content promotion on behalf of the students and create a sense of connectedness among the participants. However, the personal nature of those narratives presupposes the existence of mutual

trust, in which they can feel respected and confident in expressing themselves and where interactions among stakeholders are not connected with biases.

Based on the above, it becomes clear that DST inherently supports teaching based on a human rights and social justice perspective; the learners that create and share digital stories can rewrite any dominant narrative that opposes them and their communities by critiquing broad social issues related to privilege and power (Alrutz, 2013). This view of DST as a counter-story or an alternative world's interpretation is essential when it challenges the status quo and- generally- the largely negative and deficit-focused connotations of refugee or migrant. Finally, DST offers transformative potential for the disenfranchised people that could be proven indispensable for eliminating the existing inequalities; instead, it supports inclusion and social justice in multicultural language learning contexts.

1.3 The concepts of Belongingness and Resilience

In the field of belongingness, a consensus has emerged among researchers. It is characterised by a personal sense of deep connection within specific physical contexts and social groups and circles around sharing collective experiences with other persons (Allen et al., 2021). The notion of belonging has been considered an essential human need, in view of the fact that it is a fundamental mental necessity which arises out of biological factors, and an emergent construct visible throughout a social environment. Regarding its societal facet, belongingness exists “because of and in connection with the systems in which we reside” through our perceptions' semblances, cultural experiences and identity that gradually become visible when we act as members of new social structures and norms (Kern et al., 2020, p. 709). Based on that, it can be plausibly proposed that belongingness arises as a mental, behavioural, economic and social outcome predictor that pertains to people. An example could be the traditionally marginalized groups-such as CLD young people-that have historically struggled to become equal members of new cultural settings. Education is, for these population groups, the most efficient means of enhancing social mobility and thus their integration into society. However, in the context of migration, a person who is regarded as a resilient individual is expected to adapt positively to a series of stresses that are encountered in a new environment through continuous coping. Effective coping mechanisms tend to cause less depression and anxiety in migrant young people. On the other hand, their psychological well-being and self-esteem enhanced significantly (Wu et al., 2018).

In addition, it is useful to emphasise the inherent correlation between resilient concepts and two other concepts: empowerment and acculturation. Migrate's comparative report in various European countries (Sedmak, 2021) showed that CLD students who feel more accepted in a new society demonstrate an earlier sense of belongingness.

Since resilience and empowerment include iterative processes in which individuals recognize an unsatisfying state and develop their intention to shift it, their role in helping refugees or migrants successfully adapt and withstand inevitable adversity is interrelated. Both terms act supplementary; resilience consists of internal goals for intrapersonal outcomes. On the other hand, empowerment is enacted socially, aiming for external change to relationships and power dynamics that improve the individual's functioning within the status quo (Brodsky et al., 2022). Even though fuelled by unsatisfying circumstances, they are differentiated by changing goals focused internally (resilience) and externally (empowerment).

On the other hand, acculturation emerges as a distinct factor deeply associated with migration by recreating an essential role in contributing to various mental health outcomes related to youth from diverse backgrounds (Keles et al., 2018). It relates to the process of acquiring the behaviours code of a second culture through prolonged interactions and contacting their members by those who emanate from a different culture. To develop acculturation, there is a simultaneous development of resources, such as cultural competence, which is part of the resilience process in a sequence, highlighting thus their mutual reliance (Oppedal and Toppelberg, 2016).

1.4 Relevant Studies on Belongingness – Resilience - DST

Due to the late emergence of Digital Storytelling (DST) in the educational framework of 21st-century digital tools, a limited number of studies focus on its implementation in learning contexts, and even fewer of those concerned with the education of refugees or migrants and their feelings. The research findings of Kendrick et al. (2022) have shown that digital multimodality can enable refugee youth to represent themselves, reaffirm their identity as members of their new country, and express and process their difficult emotions about the difficulties they have experienced in the past. In the study of Martinidou (2022), five (5) immigrant students worked together in two groups to produce two digital stories, identifying viable ways for everyone to participate and negotiate their ideas. It made them more resilient because everyone was eager to share their experience of the proposed training activities. In addition, the successful student collaboration facilitated the implementation of DST in Greek Primary Schools to be seen as a future norm. Lastly, in Fokides' research (2016), the potential of DST was explored in assisting immigrant students to overcome their adaptation difficulties through digital autobiographical narration development and presentation. Even though only one student participated in the study, the findings showed that DST motivated the student to document her personal experiences- as a narrative therapy- and thus discover parts of her personality that helped her to become more resilient. In addition, the externalisation of her thoughts and feelings has facilitated her feelings of belonging in the school environment and has greatly improved her self-image. Finally, the native students' previous attitudes and perceptions of their foreign classmate have been positively influenced.

2. Methodology

2.1 Research Framework – Aims and Questions

This paper presents a part of the research focused on Digital Storytelling implementation in Action Research addressed to culturally and linguistically diverse (CLD) students. The Action Research is based on the Digital Storytelling (DST) application named “Migrant Children and Communities in a Transforming Europe”, and developed in the frame of the HORIZON MICREATE project. The research took place at three (3) Primary Schools in South Greece, and twenty (n=20) students, age range 10-12 years old, participated in the classes. These students were enrolled in the Zones of Educational Priority (ZEP) during the school year 2022-2023. They are students with migrant or refugee backgrounds since their families came from neighbouring countries, such as Albania or Romania, for economic reasons, or they have arrived in Greece as refugees and asylum seekers from Syria.

The research data was derived from four sources: a) interviews with twelve (n=12) educators, b) questionnaires to twenty (n=20) students attending the aforementioned classes, c) observation sheets during these classes, and d) the DST creation. The research focuses on whether and to what extent the exploitation of DST can instil and enhance the feelings of belongingness and resilience in a group of primary school students (10-12 years) with migrant and refugee backgrounds. In addition, it seeks to bridge the gap between theory and practice in the field of digital use tools, in

particular in the field of DST, by proposing inclusive spaces instead of monocultural practices. DST is expected to be promoted as an empowering teaching tool with transformative attributes that educators could use constantly in the future.

The study is based on the following research questions:

1. *How can a positive learning outcome be achieved for CLD students in classrooms through the integration of digital tools?*
2. *Is there any difficulty with their implementation in a linguistic context?*
3. *In order to promote the skills of CLD students, how is DST considered to be a viable instrument?*
4. *What are the ways in which the DST supports and enhances their belonging and resilience?*
5. *Would there be a place in the schools for a potential collaboration/co-teaching with teachers of computer science using DST?*

2.2 Research Context and Participants

Twelve (n=12) teachers participated in this study, answering an online questionnaire based on semi-structured questions. Participants were fully informed before the interview about the purpose of the research and the importance of their contribution. They gave their written consent concerning their voluntary participation. They are educators in Greek Primary Schools with a certain level of experience concerning the education of mainstream multicultural classes, ZEP classes or Computer Science teachers. During the last year, as part of their teaching, they have used a variety of online tools in an efficient manner and this has been deemed to make them potential candidates for interviews. Important information about their profile can be found in Table 1 below.

Table 1. *Participants' profile*

Participants	Gender	Occupation	Years teaching refugee-migrant students	Use of digital tools in teaching
Participant 1	Female	ZEP teacher	8-9 years	very frequently
Participant 2	Female	Regular teacher	2 years	frequently
Participant 3	Female	Computer Science teacher	5 years	exclusively
Participant 4	Male	ZEP teacher	7 years	occasionally
Participant 5	Female	ZEP teacher	1 year	frequently
Participant 6	Female	ZEP teacher	3 years	frequently
Participant 7	Female	Computer Science teacher	6 years	exclusively
Participant 8	Male	ZEP teacher	2 years	occasionally
Participant 9	Female	Regular teacher	4 years	frequently
Participant 10	Female	ZEP teacher	6 years	very frequently
Participant 11	Female	ZEP teacher	3 years	very frequently
Participant 12	Female	ZEP teacher	3 years	frequently

2.3 Data Analysis and Discussion

The thematic analysis was chosen as the most suitable approach for analysing the data come from teachers' responses (Creswell 2013, Nowell et al. 2017). The themes and the codes are common for all data come from the different research's sources (students' questionnaires, teachers' interviews, and observation) (table 2). The qualitative data that were derived from the interviews analyzed through the use of N-Vivo.

Table 2. *Emerging themes- codes and source of data collection*

EMERGING THEMES	CODES – SOURCE OF DATA
Positive outcomes	<ul style="list-style-type: none">· Learning goals:interviews· Enjoyment:interviews and questionnaire· Motivation:interviews and observation sheet
Challenges- Difficulties	<ul style="list-style-type: none">· Deficient educator expertise:interviews· Unavailability of technological equipment:interviews· Lack of interest – Incompetence:interviews
Promoted skills	<ul style="list-style-type: none">· Multimodality and Digital Literacy:interviews· Interpersonal skills:interviews and observation sheet· Collaboration skills:observation sheet
Emotions enhanced	<ul style="list-style-type: none">· Belongingness:interviews and DST artifact and questionnaire· Resilience:interviews and DST artifact and questionnaire
Co-teaching requirements	<ul style="list-style-type: none">· Collaboration – Communication:interviews· Segregation of teaching roles:interviews

Responding to the first of the research questions about the positive outcomes that digital tool exploitation can induce for CLD students, the data gathered through interviews show interesting findings. Digital tool usage facilitates the students' acquisition of learning goals and their enjoyment. Furthermore, it tends to motivate them further. Concerning learning objectives, participants have indicated that digital tools help to absorb new information by making it more understandable and pleasant in the context of reinforcing language with sounds and pictures. Furthermore, by creating safe spaces for dialogue, collaboration and their own unique skills to be able to appear on surfaces, digital tools provide a more holistic environment for students (Table 3).

Moving on to the challenges regarding digital tool implementation in language teaching contexts, the teachers responded that those are owed to the deficient expertise of educators, a shortage in technological equipment in school units and a potential students' lack of interest. The educators' lack of knowledge may is related to educators' older age which has rendered them unfamiliar with digital tool exploitation in linguistic contexts. Another explanation could be that this happens due to a lack of training in the specific sector. This is relevant to the study of Palaiologou et al. (2021) mentioned that for the students' successful gradual integration through the steps of DYEP from reception classes to full-time mainstream education, a better training of teachers at DYEP is required, as a precondition for their successful placement.

Table 3. *Teachers' responses, Research question 1*

First research question Research Question 1: How can the integration of digital tools induce positive outcomes for CLD students in classrooms?	
Learning goals	<p>P2: "They contribute positively to the processing of teaching objects and the reinforcement of students' unique competences and skills."</p> <p>P3: "Digital tools help in the complete comprehension and absorption of information on behalf of the student audience...the power of image and audio render the information more palatable (and more interesting)."</p> <p>P5: "Through the creation of collaborative learning, dialogue and expression of emotions and experiences."</p> <p>P7: "...I believe that they greatly aid students' reinforcement and the formulation of an holistic approach to their education."</p> <p>P12: "...the children often think that they are playing while in parallel they are learning. The students can thus understand the teaching object without depending exclusively in language as a means."</p>
Enjoyment	<p>P4: "I believe that they make the educator's life easier, the teaching hour more pleasant and the students more participatory...they are likeable to the students and by extension they make the lesson more pleasant."</p> <p>P7: "Through digital tools, students are more absorbed and learn more easily and entertainingly, without the stress of performance in traditional, monotonous teaching practices."</p> <p>P12: "...they make teaching more interesting and more playful for the children..."</p>
Motivation	<p>P3: "The feedback from students was very good, they like those types of strategies! They reveal a special interest and the image and sound remain at their mind."</p> <p>P5: "The children gain interest for learning, in a pleasant context of collaboration."</p> <p>P6: "...even in the emotional part as they will not feel alienated but they will feel that they participate in something common with the other children."</p> <p>P7: "Identifying symbols and images without the barrier of written word and participating more actively, their self-confidence is reinforced profoundly."</p> <p>P11: "Yes. Through images, audio and video foreign language students can learn the language more easily because the stimuli are many and the knowledge transmission mode is more interesting."</p>

Table 4. *Teachers' responses, Research question 2*

Research Question 2: Are there any challenges-difficulties regarding their implementation in linguistic contexts?	
Deficient educator expertise	<p>P1: "The deficient knowledge of educators concerning the use of digital tools does not render frequent their utilization. The training of educators in this field is advised in order to get to know the technology that is used for the facilitation of teaching."</p> <p>P10: "The teachers of older age perhaps are not so familiar with such tools."</p>
Unavailability of technological equipment	<p>P2: "Many school units do not possess a modern technological equipment, perhaps a minimal."</p> <p>P3: "There is a problem, in case that one does not know how to operate digital tools, or in case that the supervisory material is not available in the school."</p> <p>P7: "Since we depend on technological equipment, it is a very frequent phenomenon that in action there are technical issues. Many schools do not possess the basic technological equipment and those that do, it is not modern. Thus, valuable time is lost."</p>
Lack of interest - incompetence	<p>P4: "Many students with a migrant and refugee background are not familiar with the use of digital applications. Moreover many times during their use they feel that they antagonize their schoolmates resulting in their ineffective learning."</p> <p>P5: "It has happened that some students are not willing to cooperate or participate in the educational process with the use of digital tools."</p> <p>P6: "A difficulty is that perhaps it does not capture the interest of all children and at that time the educator will need to intervene, to make potential modifications and possibly to evaluate this tool for an upcoming potential use."</p>

In addition, teachers claim that most Greek schools are often equipped with outdated technology which is characterised by multiple technological problems and in some cases do not even have computers at all. As far as the difficulties related to using these tools are concerned, teachers have responded that some students do not know how to use them and this has created a lack of participation or antagonisation from their more experienced peers (Table 4).

The teachers argue that this enhances multimodality and digital literacy of students as a 21st-century skill, by referring to the third research question in relation to the role played by the DST in promoting student skills. In particular, they agree that the combination of audio, image and video with written speech can contribute to multimodal language learning for students from diverse backgrounds by virtue of DST's affordances.

In addition, DST may develop students' digital and optical literacy by conveying concepts such as storytelling into the 21st century. Furthermore, the interviewees agreed that it would help students to learn to speak the language, to conquer it and to communicate more easily when DST is accompanied by simple and repeated vocabulary with reenactments and pictures. This also comes from the study carried out by Pierrakou (2021), which showed that when refugee students produce digital stories, they become collaborators when they share them with their classmates in order to exchange feedback (Table 5).

Table 5. *Teachers' responses, Research question 3*

Research Question 3: How is DST rated as a viable tool in the promotion of skills of CLD students?	
Multimodality and Digital Literacy	<p>P2: "The digital storytelling, is a modern approach that will contribute to the language learning of the students with the help of audios and image."</p> <p>P4: "It is a very useful tool as it develops the written and oral speech, the critical knowledge and the optical and digital literacy of students."</p> <p>P7: "I generally consider the exploitation of stories as a very useful approach in language learning as language is presented in a realistic context. The digital storytelling that connects the image (that we already have in traditional storytelling) with the audio brings storytelling to the modern age."</p> <p>P10: "I consider it extremely helpful for students with a migrant and refugee background mainly due to the combination of image, video, audio with the written word."</p> <p>P11: "I consider digital storytelling a very interesting approach that will help children combine audio and image and gradually learn the language in a pleasant manner."</p>
Interpersonal skills	<p>P10: "The simple and repeated vocabulary I believe that helps the students enough to conquer the language and get used to it verbally."</p> <p>P12: "Only if the narration is accompanied by image/reenactement and slow motion I believe that it would function auxiliary for these students. And this I believe would function positively following the acquisition of basic vocabulary of the students in order to be able to attend speech with flow."</p>

The fourth research question deals with the usefulness of a DST in enhancing CLD students' identity and resilience. The teachers' responses have shown that DST is turning into an empowering tool for personal expression and the context of trust and inclusion allowing students to feel like they belong in a place. In addition, by giving them the freedom to take part in their activities and to focus on their powers, they will be removed from the sidelines that they have been placed on because of their linguistic barriers and will return to the centre of the activity. Those responses conform to Micreate's comparative report in various European countries (Sedmak, 2021) and its findings

showed that CLD students who feel more comfortable in a new society tend to have an earlier sense of belonging. Furthermore, according to Palaiologou and Prekate (2023) specific interventions need to be established to create an inclusive school environment.

Concerning the reinforcement of resilience through DST, the teachers argued that students could demonstrate their ability to overcome obstacles in their lives and demonstrate considerable determination by identifying themselves as heroes of the story, given that there are no elements of the story that could traumatise them. Moreover, they can create their own stories and enrich them in their experiential way, through which they can be empowered as well as raise self-esteem and appreciation for themselves. (Table 6).

Table 6. *Teachers' responses, Research question 4*

Research Question 4: How does DST foster and enhance their belongingness and resilience?	
Belongingness	<p>P1: "DST constitutes a powerful medium of personal expression that provides the means for anyone to be heard and displayed. It facilitates the contact and communication amongst people, it unlocks the mind as well as the heart of individuals and gives them the opportunity to feel that they belong, that they fit in somewhere."</p> <p>P3: "DST could reinforce the sense of belonging, in case that after this narration, there is dramatization and connection-communication of students' feelings with the rest... a more relaxed atmosphere is created where those children can feel at home."</p> <p>P5: "Through DST, students have the ability to share with their schoolmates, their lived experiences, the emotions, the thoughts, but also their worries, and thus create a context of trust and inclusion."</p> <p>P6: "...something like that, would help them in their integration, it would reduce the feeling of alienation and moreover they would feel that someone takes them into account. Mainly they would feel that they become part of a team despite the differences that are logical to exist... a feeling of belongingness is developed, as they feel they become part of a team – a set within which there is a possibility to create closeness between its members. The above is considered more important than any learning goal."</p> <p>P7: "By offering a more pleasant experience, those kids feel members of a school community, enhancing their self-confidence."</p> <p>P10: "Personally, I believe that it creates a feeling of belongingness to the students that believe that they are on the sidelines, due to the language, or because they do not fall under the perfect students of the classroom. They participate in their own way to the lesson, hence I believe that they gain the confirmation and acceptance."</p> <p>P11: "DST helps children remain in their childhood, consider school as a familiar environment without feeling insecurity, being a minority as they do not know the language."</p> <p>P12: "DST gives students the opportunity to maintain their spontaneity. The adaptability of students in the school environment is increased as they deal with school as a familiar place that offers them security and protection."</p>
Resilience	<p>P3: "Their psychological resilience will be reinforced, as they may identify themselves with the heroes of the fairy tale... Storytelling is legitimate and interesting on the supposition that it operates in a way that does not traumatize the children's soul, but it empowers them."</p> <p>P4: "...the notification of those stories make easier the psychological resilience of those people... Additionally, through that they can create stories by themselves and narrate them enriching them with their own experiential way. This way their self-appreciation is developed and enhanced."</p> <p>P9: "Through the reenactment of familiar stories, students with migrant background can transfer their experiences to the other students and by that show that they have managed to overcome the adversities of their lives."</p> <p>P12: "...it can reinforce the sense of belonging as they can participate in lessons from which potentially they would abstain since they did not understand their content because of the language... as long as the sense of belonging is reinforced, by extension their self-esteem and psychological resilience will be reinforced as well".</p>

Table 7. Teachers' responses, Research question 5

Research Question 5: Is there a space for a potential co-teaching using DST with the Computer Science teachers in schools?	
Collaboration-Communication	<p>P1: "Through the proper collaboration and communication amongst educators, there can be an available space for a potential co-teaching."</p> <p>P2: "I believe it would be very interesting for the students and the educational staff, as the educational process is refreshed."</p> <p>P3: "With the assent of the school principal, the disposition of the educators and the adjustment of the program."</p> <p>P4: "Sure there could exist... In any case the collaboration among the educators is required."</p> <p>P6: "...teaching is an interaction between the individuals that participate at that moment and this could be a way to achieve something like that."</p> <p>P10: "Yes, I consider it a great preposition. The Computer Science teacher could help the students acquire the competences that are necessary in order to interact with digital means."</p>
Segregation of teaching roles	<p>P2: "The Computer Science educators could design and provide the digital part to the educators of the reception class who could assume by themselves the projection with the provision of further information and clarifications to the students."</p> <p>P4: "With the collaboration among educators. For example, in the language education as long as students are taught the relevant vocabulary, in the Computer Science class with the appropriate support they can apply what they learned."</p> <p>P7: "Obviously the colleagues of Computer Science will be able to take over the digital part and with the teacher design the lesson depending on the educational object that the teacher wants to focus on."</p> <p>P11: "The educator of Computer Science can assume the digital part and the educator of the reception class the explanation and feedback."</p> <p>P12: "Yes, as the teacher of Computer Science could familiarize children with the use of this digital tool. He/She could also create in the Computer Science lesson narration with the help of appropriate software so that the students understand the tool that they are using from every angle."</p>

Teachers responded to the last research question mainly by focusing on two essential requirements, collaboration, as well as communication between colleagues and their roles, which need to be adapted for an effort like this. There was a consensus among educators that the educational process could be refreshed by this development which should be welcomed. The teachers said that the agreement of the principal is necessary, along with modifications to the curriculum. As for the segregation of their roles, each of them could take over a certain role. In more analytical terms, the role of the regular teacher could be to design the lesson, to teach the relevant vocabulary and to provide clarifications and feedback throughout the whole process. On the other hand, the digital part should have been assumed by the teacher of Computer Science, who could then choose a suitable software to project it. (Table 7).

3. Conclusion

The analysis of the twelve (n=12) teachers' responses showed that digital tools can influence students' acquisition of learning objectives by providing a more holistic and inclusive environment, which makes the incoming information more pleasant and understandable. Additionally, students' enjoyment and motivation levels are enhanced because digital tools excite them through their multimodal affordances. Nonetheless, a series of challenges obstruct the effective implementation of digital tools in linguistic contexts. These challenges exist mainly due to digital tool users,

educators with a deficient knowledge of using them on certain occasions and students that may lack an interest in their exploitation. Moreover, another challenge is the lack of proper technological equipment, a general problem in Greek schools for years now.

Furthermore, the interview data demonstrated that DST promotes learners' multimodality and digital literacy by bringing a concept as old as storytelling to the modern age. Additionally, it was agreed that when DST is used complementarily with simple and repeated vocabulary, it can encourage communication among students. DST encourages a healthy dialogue that helps to create a context of collaboration between students who decide unanimously, taking part in roles that will allow them to develop their greatest potential. In any case, DST is valuable considering the reinforcement of emotions such as belongingness; this could enable students, by sharing aspects of their culture and reducing language challenges typical to traditional teaching methods, to gain a sense of belonging. Furthermore, by constantly overcoming difficulties and striving for success, students make themselves resilient individuals with hopes for the future.

Finally, the data showed that there is also a space for co-teaching using DST between the regular or ZEP teacher and the Computer Science teacher. This can be successful in case there is an understanding among the teachers regarding their roles and how they could be segregated to maximise the learning outcomes and also considering that they can communicate and collaborate effectively.

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13. How Remote Emergency Teaching Changed Student Learning and Pedagogical Practices in a Stem Discipline

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Abstract. In response to Covid-19, many university teachers transitioned to emergency online teaching. Although intended as short-term solutions, many have continued beyond the pandemic. Some changes were beneficial, maintaining high learning quality with benefits beyond previous practices. This study aims to build on positive experiences during the pivot to online pedagogical practices in a STEM discipline, to assist university teachers in reflecting on the effectiveness of their post-pandemic online and hybrid practices. This paper uses a case study to present this reflective approach. The methodology uses Activity Theory to study reasons for changes in practices and to analyze these changes. The findings reveal that while many methods were welcomed by students and academics, not all interventions had equal success for learning. The results also showed increasing awareness of staff and students' well-being and the importance of accommodating social interaction and collaborative learning in pedagogical practices.

Keywords. *Engineering Education, Pedagogy, Covid-19, Activity Theory*

1. Introduction

Undoubtably, the Covid-19 pandemic has significantly disrupted higher education institutions across the globe. Academics had to reconsider their methods for teaching and learning as a result of the lockdowns, working from home, and social isolation measures that were imposed in response to the pandemic. Universities and their teaching staff were thus compelled to figure out how to deliver education using both current and emerging technologies. One such solution was how many institutions quickly transitioned to online learning early in 2020. But this also led to additional difficulties, particularly in specialised areas such as training computer engineers. This study aims to present an approach for reflecting on the pivot to online pedagogical practices in a STEM discipline, in order to assist university teachers in reflecting on the effectiveness of their post-pandemic online and hybrid practices. The approach presented is based on the use of Activity Theory (Engeström, 2000) for reasoning and analysing changes in pedagogical practices. A significant aspect of this approach is determining the principles or the predominant values that influence decision-making when deciding the changes to teaching and learning practices and their implications to education.

A case study is presented in which pedagogical changes were made to an engineering course, which transitioned from a combination of classroom-based lectures and lab-based practical work, towards to students working remotely with much reduced opportunities for collaborative learning and access to tools and equipment. The case study involves an embedded systems course that is a component of a South African university's computer engineering degree program. This course was selected for this study due to its complicated dependence on specialised tools and communication needs, in addition to having a highly diverse student body. For instance, the course involves much interaction with, and dependence on, specialised development tools, some of which work only on higher-spec computers. Additionally, online tools to support communication beyond what is provided by standard video conferencing tools were needed to enable collaborative teamwork and remote access to resources. These complications were partly attributable to added challenges of Graduate Attributes (Gutiérrez Ortiz et al., 2021) being assessed in the course.

This study was partly inspired by a hypothesis, put forward by the author and discussed among teaching staff near the start of these curriculum changes, that the learning practices to be incorporated for emergency online teaching should not only be based on tools that are commonly used in industry, or for problem-solving scenarios linked to the learning subjects; but rather the tools and the way students are guided in their use also need to enable students to solve their tool-related challenges on their own, and to be supplemented by, or incorporate, functionality to enable remote teamwork and training scenarios. While this hypothesis was largely validated, many further important factors were identified in reflecting on the changes that were made; these are discussed in the results and conclusion of this paper. Another significant pivot point to teaching is now looming, one which poses even more changes to our teaching practices and challenges in determining their implications ... which is the incorporation or leveraging of artificial intelligence in pedagogical practices. But that is a suggestion for future research.

2. Theoretical Framework: Activity Theory

The methodology for this paper utilises Activity Theory, which is a practice-based approach that offers a robust framework for analysing human activities, including teaching and learning, which is useful in developing a sharable representation of the system and for gaining insights for how it can be improved. Activity Theory “enables researchers to analyse complex and evolving professional practices, and practitioners to engage in reflective research” (Foot, 2014). Therefore, Activity

Theory is well suited to investigate how teaching and learning in computer engineering may be enhanced.

A generic learning activity system is shown in Figure 1 that models mutually interdependent element of the system. These elements are summarised in the points below. The text in *italics* next to each element in the figure are examples of what these elements comprise in a typical embedded systems course.

- 1) Subject: these are the participants of focus in this system,
- 2) Object: this is worked on by the subjects,
- 3) Mediating artefacts: the subjects use these to accomplish work,
- 4) Division of labor (or DoL): specifies the roles of people involved in the system,
- 5) Community: all people involved or influencing the system (possibly external to it),
- 6) Rules: the policies and cultures that influence or regulate activities within the system.

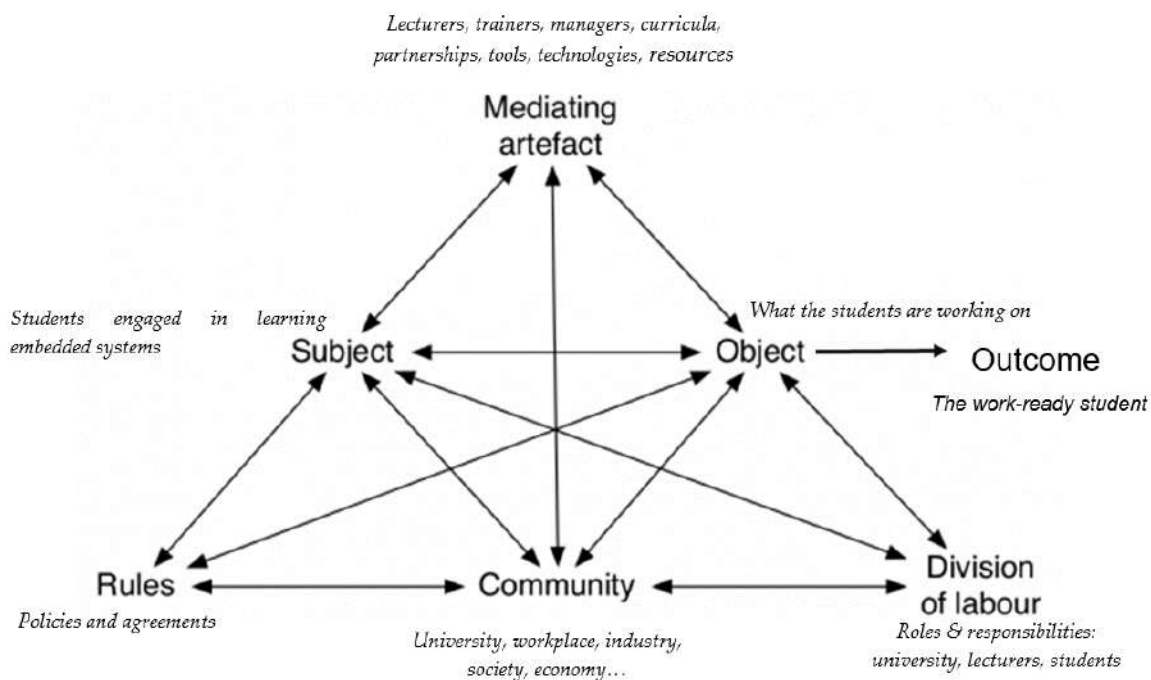


Figure 1. A learning and teaching activity system for embedded systems engineering. Source: Adapted from (Yrjö Engeström, 2001).

The learning activity system shown above has six core parts, each having cultural and historical dimensions. The first three are the subject, object, and desired outcome. The outcome, or the “focal entity and/or a desired outcome” (Foot, 2014) is the overall aim of activities pursued in the system. The mediational artefacts are used by the subjects, or assist them, to act on the object to achieve the outcome. These mediational artefacts comprise the “tools” or “resources” and can be human, material, conceptual, or cultural. The fourth component in an activity system, the community of significant others, are people who share an interest in and involvement with the object. An activity system “is always a community of multiple points of view, traditions and interests” (Engeström, 2001). Relations between the subject and the community are mediated by the last two components: the rules that regulate the subjects’ actions on an object and relations with other participants in the activity, and the division of labor, as in “who does what”, which is also separated by both the

“horizontal” division of tasks and the “vertical division of power, positions, access to resources, and rewards” (Engeström, 2001). People may experience challenges, or conflicts and dilemmas in carrying out this work, which Engeström describes as ways of working that are underpinned by “historically accumulated contradictions” (Engeström, 2001). Such contradictions can motivate people to seek innovative solutions and new ways of working. These new ways of working often require fresh ideas not previously considered or previously considered ineffective for this type of work. In developing these new ideas through “expansive learning”, innovative ways of thinking about work and learning can emerge, and can progressively be made more concrete (Graham, 2022).

3. Methodology

This study focused on determining the principles, or the predominant values that influence decision making, when deciding on how to change teaching and learning practices in a specialised field of engineering education. In particular, looking at how emerging practices could potentially change and improve the ways embedded systems education is provided.

The methodology used in this paper traces the evolution of teaching in the embedded systems course over a three-year period, from 2020, at the start of the COVID-19 pandemic, to 2022 when most of the social distancing and other restrictions had been removed or reduced in the educational context.

The data for this investigation was obtained through formative and summative evaluations of the embedded systems course that happened over the three-year period. Each evaluation started with an informed consent query and assurance of anonymity in the data obtained. Data has not been used from surveys that the participants did not provide consent. Most of the participants, over 90%, did provide consent. Accordingly, three cohorts of students provided feedback in relation to their learning challenges and successes in the different versions of the course. The responses by participants were labelled according to participant number (from 1 to the number of evaluation responses in that year) and the year of the course.

The course facilitators kept records of their reflections on their teaching strategies over the three years, including notes on the effectiveness of these practices.

These data were analyzed, drawing on the Activity Theory framework described above.

4. Results

Over the three years, the evolution of the embedded systems course involved a series of shifts. Initially, in 2020, there was the sudden shift from a more traditional classroom and lab-based learning model towards a basic distance learning model. In 2021, an improved blended model was implemented that leveraged a larger collection of software and hardware mediating artefacts to suppose learning. The third implementation, in 2022, led to a ‘new normal’ model of hybrid teaching and learning that is becoming more established. This ‘new normal’ drew on experiences of the prior years, putting in place a more refined approach that also allowed for additional opportunities for hybrid learning, as well as putting in place restraints to where hybrid learning was used. Reflecting on the latest 2023 plans, the teaching for this course is settling into a ‘new normal’, but some elements are still in flux. For example, some students prefer hybrid forms of learning and teaching, while others prefer mainly venue-based learning and teaching practices. The academic staff consistently show a preference for venue-based teaching, supplemented by recorded lectures and/or podcasts. From 2022, each class in the computer engineering program was given a “home

room”, which was a dedicated area in which tutorial and individual work could take place, but this is one of the aspects still in flux to determine to use this approach effectively.

The results for this study have been partitioned into two aspects: 1) findings regarding student challenges and views, and 2) findings concerning instructor challenges and views.

4.1. Students’ Challenges and Views

Students quickly became familiar with communication tools like Zoom and MS Teams, as well as more specialised tools (e.g. Discord). However, it was challenging to implement effective engineering teamwork and collaborative learning. Students had to learn how to use online/virtual laboratories and equipment. Not all attempts met with success, such as attempts to use lab equipment such as oscilloscopes; in 2020 and 2021 portable oscilloscopes were delivered to all students; but it took some time to learn how to use them. The online platforms provided limited opportunities for collaboratively using the equipment. There were also limitations concerning practical training opportunities or participation. This was partly due to many students struggling to allocate sufficient time towards their studies, which was attributable to multiple reasons, such as in 2020 many students were trying to study at home but had more limitations in terms of times and places in which they could work. This was characterised by a mid-course query regards to views on handling the practical workload: “They were useful in an exhaustive kind of way. Forced to engage due to much work to submit.” [participant 8:2020]

The additional material/recordings took considerable time on the part of the academic staff, who basically had to do double the work, as in preparing lecture videos with additional supportive explanations and activities that supplement the prescribed reading and lectures. This was a response in regard to evaluation responses in 2020 that requested additional learning resources, as exemplified by the comment “there should be lecture videos or recordings separate from the Zoom meetings” [participant 3:2020]. Although these additional recordings, among other resources, were added to the course, the usefulness of these recordings were still varied; for instance it was stated “The work load was too much on this course, it's like were doing two courses at the same time.” [participant 3:2021]. And the point “I would appreciate very concise notes with more emphasis put on practical examples” [participant 1:2021]. Thus in 2020 students had been indicating need for additional resources whereas in 2021 there were concerns that there was too much information and resources to deal with. Accordingly, the content for 2022 was adjusted to attempt an improved compromise between the amount of content and presentations provided. This also met with varied views, for example in 2022 it was stated that “the course was structured well, the presentations clear but I felt like tutorials were just testing your knowledge [and] they not being for marks would have been great.” [participant 5:2022].

4.2. Teaching Staff Challenges and Views

In this section, some examples of the successes and challenges of changing the way of teaching embedded systems are outlined. These are based on identifying key aspects of the course preparation and commonalities between the three different years of the course.

Iteration 1 (2020): There were considerable delays in getting equipment and components – and these had to be delivered to students at their home addresses in urban and rural areas over the whole of South Africa, as well as outside of South Africa. In this iteration, students worked largely independently and much of the support provided was not subject-related (e.g. tool setup). Tutors did help significantly with this, but many also needed specialised training in how to use the

communication tools and set up the specialised software that the students were encouraged to install on their own machines.

Iteration 2 (2021): There were fewer delays in obtaining equipment and delivering the equipment to students, but this process was still provided. Although mostly the same equipment (such as USB oscilloscopes) were chosen, the prices increased in addition to parts shortages which together caused pracs to start later than planned and also put much strain on the budget. On the upside, students more naturally formulated teams and learned to work online collaboratively and effectively. Much of this expertise was learned through trial and error last year. By this stage, most of the support was subject-related (e.g. design reviews), which was more manageable and the workload could also be distributed, for instance to teaching assistants, to assist with this type of interaction. But there were still demands for more resources and content to assist with learning, and this involved much effort. In reflection, 2021 was an intense teaching year and it was difficult to allocate sufficient time to other work responsibilities.

Iteration 3 (2022): Besides problems of serious equipment shortages, more so than last year, the “new normal” began to take shape. There were well-functioning hybrid labs, and students worked when and where they pleased – which in retrospect was not ideal. A problem with a hybrid approach, especially for labs, is that the participation in labs may change widely between weeks. For example, when students are very busy with other course assignments, they might do the labs remotely after hours, when teaching staff are not available to assist. This can result in students lacking opportunities in developing social skills in discussing and explaining problem-solving strategies in lab contexts, which is certainly beneficial knowledge for engineering graduates. Although these attitudes varied over the year, the students were generally eager to participate in classes and labs on campus in 2022; indeed one of the first questions in the first lecture for the embedded systems course was: “when do we get to the lab?”

5. Conclusions

In consideration of these findings, especially the differences in the views expressed by students and academic teaching staff, there seemed to be a complex activity system at work.

A significant factor, especially in retrospect to 2020 and 2021, is how each new intervention made additional demands that left many academics and students exhausted. In addition to inequalities exacerbated in the online environment that needed to be urgently addressed, for example, laptops and components were delivered to students’ homes in 2020 and 2021. Many of these difficulties led to much expanded workloads and complications not usually experienced in the pre-pandemic approaches of teaching. It also became increasingly apparent that the teaching system presented earlier is somewhat limited in capturing the influences and activities of the teaching system; for example some tools students accessed remotely were not as functional or responsive as those used on campus by academics preparing assignments.

For this reason, and using concepts from “Third Generation Activity Theory” (Engeström, 2001; Murphy and Manzanares, 2008) a re-framed model is suggested for gaining better clarity on teaching practices, which is presented in Figure 2. This is aimed to reveal more of the emerging opportunities for change and development of current practices, as well as consideration for such adapted practices to remain useful in the future. A benefit of third-generation Activity Theory offers insights into the “contradictions” between the activity systems of the physical and virtual classroom from the perspectives of students and lectures who have transitioned from one system to the other (Murphy and Manzanares, 2008).

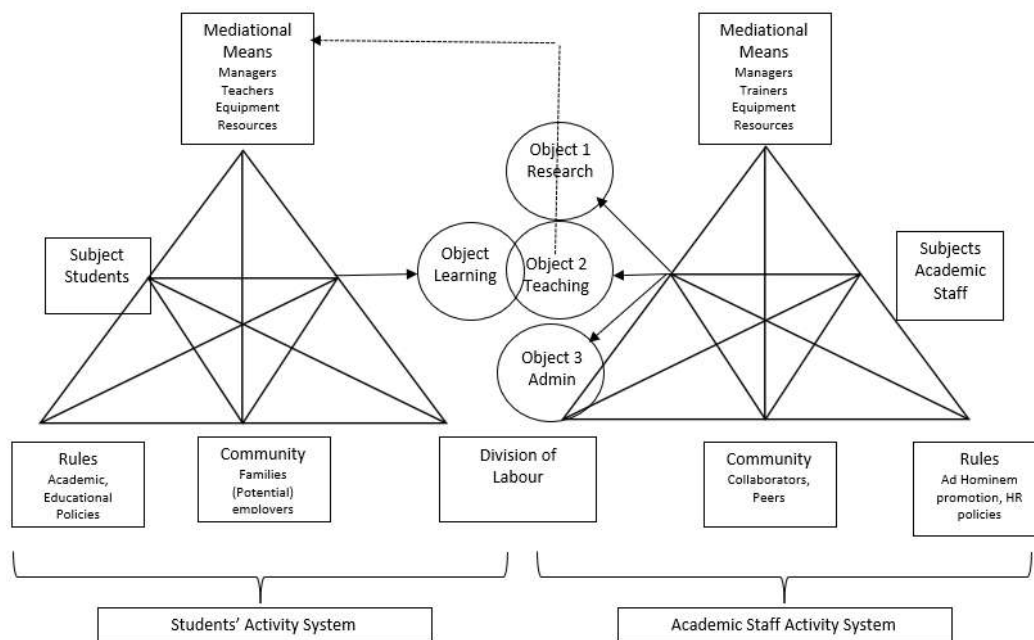


Figure 2. *Learning and Teaching as two interacting activity systems.* Source: Adapted from (Engeström, 2001).

Using third-generation Activity Theory, the different view of students and lecturers in the transition to hybrid learning and teaching can be seen as contradictions across the two systems. The students are expected to focus on learning, and they have had to master various new tools and online platforms in order to accomplish learning in online environments. For the lecturers, the new online learning and teaching system has created a considerable extra burden of work. The lecturers do not have a sole focus on teaching, but have multiple objects in their activity system, including research, academic administration, amongst others. In the South African context, lecturers are also expected to make a contribution to community engagement. The interacting activity systems show these contradictions more clearly than when learning and teaching are conceptualised as a single activity system.

The Covid-19 pandemic has made it necessary for institutions to adjust their teaching and learning practices to ensure continuity of education (Kruger et al., 2022). This has led to the increased use of technology, including online platforms, to facilitate learning. However, this has not been without its challenges. The lack of access to technology, poor internet connectivity, and limited resources have been major obstacles to providing effective online education. These challenges have been felt even more acutely in specialised fields such as computer engineering. Effective post-pandemic computer engineering education will require a rethinking of traditional teaching and learning practices. Institutions will need to consider how they can leverage technology to provide a more immersive and engaging learning experience for students. This will require a significant investment in technology infrastructure and resources. It will also require retraining of academics to enable them to use these technologies in their teaching. One principle that underpins effective post-pandemic computer engineering education is the need for collaboration – which is surely a necessity for many other fields as well. Emphasising collaboration among academics, industry partners, and students is

essential for providing an effective, beneficial and sustainable approach to quality teaching – a factor quickly noticed in Figure 2.

Reflecting on the hypothesis made early in 2020, and mentioned in the Introduction, was the expectation that attempts to put in new online tools should be supplemented by remote teamwork and training scenarios. The findings do, to a large extent, validate this hypothesis. For example, in 2021 it was decided to explicitly train tutors for effective use of Discord and other collaborative tools that students had been making use of since 2020 to share solution strategies. But further support was also needed, such as availability of easy-to-use tool documents and provision for added time that students may need to learn how to use tools on their own or with only limited online support.

The findings have also shown the surrounding factor, that was increasingly evident in the data as the years progressed, such as comments in 2021 about the amount of course content being overwhelming. Additionally, students trying to strategise and reformulate course activities to better cope with the tools and limited time they had to complete these. But also the problem of hybrid learning provides the potential for more easily planning time to work on tasks, but at a potentially significant cost to professional social development. In all, this Emphasises the importance for increased awareness of staff and students' well-being and the importance of communication and social interaction during learning.

This research aims to contribute to post-pandemic pedagogy by tracing the evolution of an engineering course, showing that although change is unsettling, innovation and change can spark ideas for new ways that academics and students can plan and reflect on their teaching and learning experiences.

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14. Change laboratories, Activity Theory & academic staff development

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Abstract. This research reports on an Activity Theory-inspired collective, approach to Faculty development, the change laboratory. Change laboratories are future-orientated workshop spaces in which the wisdom of the participants, drawn from their past and current experiences, is used to collaboratively develop improved practices. This approach has not been extensively used in higher education studies and academic development but shows great promise for this field. Furthermore, the laboratories usually occur over an extended time period whereas here they were conducted within one week. In this research, staff are confronted with a rapidly changing student body, changing academic work and faculty and administrative structures, and struggle to pin down what is at stake and what can be done. They identify a lack of communication and collaboration between all members of the community as a historically developed, deep-seated, systematic tension within the programme. Through understanding and confronting such tensions, participants are inspired and capacitated to explore new possibilities for practice.

Keywords. *Activity theory; change laboratories; academic development*

1. Introduction

Authors such as Dorner and Belic (2021) and Boud and Brew (2013) propose that ‘bottom-up’, departmental/workgroup developmental initiatives are more efficacious in promoting change in teaching and curriculum than their more generic counterparts.

Les back (2015) of Goldsmiths suggests that there is an urgent need for anthropological examination of working life at universities, against the backdrop of increasing bureaucratization and forces of neoliberalism associated with this. There is a need to resist the forces of ‘fast academics’ and create slower spaces to support the development of insightful and creative thinking. Our tentative proposition is that the change laboratory (CL) methodology can go some way to providing a space for this form of resistance.

This research reports on an Activity Theory-inspired collective, bottom-up approach to Faculty development, the change laboratory (CL), which has not been extensively taken up in university developmental work but which shows great promise (Englund, 2018). Change Laboratories are future-orientated workshop spaces in which the wisdom of the participants, drawn from their past and current experiences, is used to collaboratively develop improved practices (Sannino and Engeström, 2017).

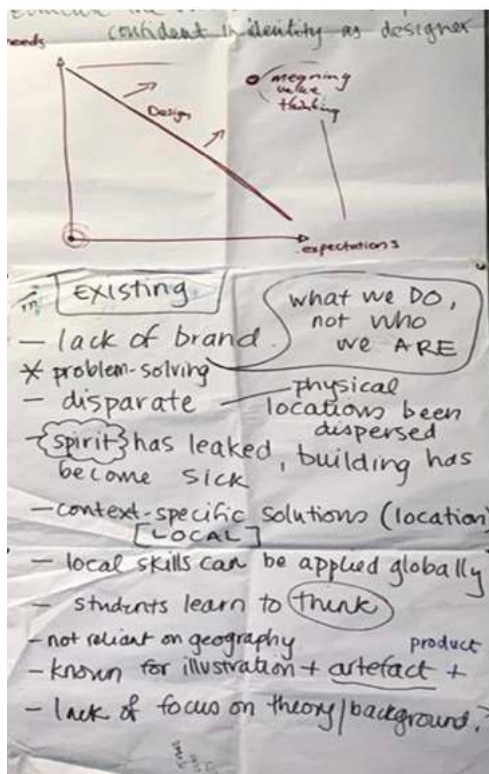


Figure 1. Manifestations of despair in working life – newsprint relic of prior discussions aimed at solving problems in the Design programme.

The site of the research is a Design workgroup within a technological university. Staff are confronted with a rapidly changing student body, changing Design workplaces and faculty and administrative structures, and struggle to pin down what is at stake and what can be done. One newsprint record of the workshops, currently on their staffroom wall, illustrated a sense of despair

in staff's working lives, with comments such as 'our spirits have leaked' and the 'building has become sick' (Figure 1). In our view staff had reached an impasse and were experiencing what Engeström, Nuttal and Hopwood (2020) describes as a 'paralysing conflict of motives'. It was against this backdrop that the authors decided to engage the staff in a change laboratory (CL) in an attempt to assist the workgroup to break out of this gridlock.

In working intensively with the Design workgroup in 7 successive sessions, current difficulties experienced by staff were elucidated through Activity Theory analysis. A lack of communication and collaboration between all members of the community was identified as a historically developed, deep-seated, systematic tension within the workgroup. Through understanding and confronting such tensions, participants were inspired and capacitated to explore new possibilities for practice (and (Sannino and Engeström, 2017), one example being the development of a 'care code of practice' between staff, students and all role players.

2. Methodology

The change laboratory is a collective learning initiative underpinned by the theory of expansive learning (Sannino and Engeström, 2017; Virkkunen and Newnham, 2013). It broadly follows the expansive learning cycle (Figure 2) with its series of learning actions of questioning, analysing, modelling, examining the model, implementing the model, reflecting on the process, and consolidating the new practice.

The change laboratory typically begins with participants presenting different perspectives on problems they encounter in their day-to-day work. This acts as a stimulus for open-ended discussion of problems which are then analyzed as contradictory pushes and pulls using activity system diagrams (Figure 3), which constitute a secondary stimulus. Thereafter, participants are supported in developing new ideas which can potentially resolve the identified contradictions.

As is typical in a change laboratories, the facilitators usually supply some form of initial stimulus as well. In our case we presented two interviews, one with the HoD and one with an ex-student, highlighting difficulties with changing students, the curriculum and relations with industry.

As Virkkunen and Newnham (2013) describe, unlike in other problem-solving processes, much time and attention is spent on raising and discussing problems participants are confronted with. This first stimulus is subsequently worked on through the provision of secondary stimulus, the activity system of the department (Figure 3), which assists the participants in moving from heartfelt emotions to more theoretical understandings and reasoning.

The activity system diagrams are built successively in the workshops and involve the analysis of difficulties and conflicts both in the present and as they have emerged in the past. The activity system is composed of mutually dependent elements. In short, the elements refer to what the participants understand they are working on making happen within the university (the object or raw material); what they are using to do this work (tools); who else is involved with working on the object (community); and how the work of the participants (the subjects) is governed by the rules/culture they operate in, and how the roles are divided up and who holds the most authority (division of labour or DoL).

The main function of the activity analysis is to enable participants' transition from narrative, discursive manifestations of difficulties to understanding them as systemic contradictions within

and between the above elements. Furthermore, through examining what changes have occurred in the different elements of the activity system over time, the nature and origins of the contradictions can be explored in greater depth (Engeström and Sannino, 2011). Through gaining such detailed and systematic knowledge, participants are assisted in constructing new, improved activity systems that can potentially overcome these contradictions (Sannino and Engeström, 2017).

However, actually generating new systems and ideas as potential solutions to identified problems is only one of the potential outcomes of a change laboratory (CL). CL work can also develop participants' transformative agency. Transformative agency is characterised by participants being able to transform an initial, individually experienced, problematic situation into something that can be collectively worked on through utilizing external tools. Furthermore, such agency manifests itself through participants' ability to envision new possibilities and take (or plan) actions to change their current situations (Kerosuo, Mäki and Korpela 2015).

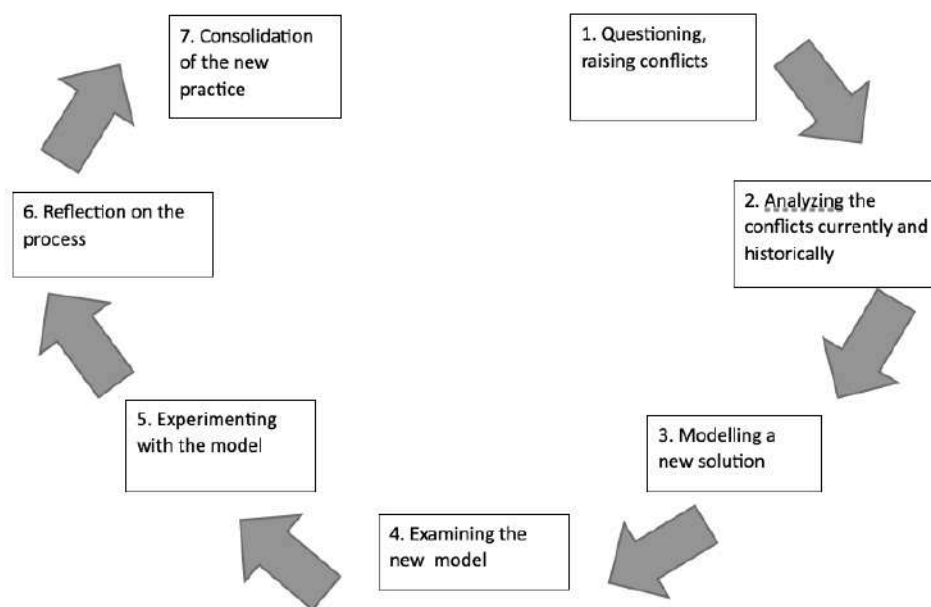


Figure 2. *Expansive learning cycle (adapted from Virkkunen and Newnham 2013).*

3. Results from the expansive learning sessions

Learning action 1 from Figure 2: Questioning the current situation and raising conflicts

In response to the videoed interviews (first stimuli), staff raise a number of difficulties in their working lives. A strongly emerging trend was that of feeling that the university management and industry expect different outcomes; staff experience themselves as being between a rock and a hard place:

I feel we are damned if we do, damned if we don't. we are damned if we let all our students pass then industry blames us for poor students, but if we fail them the university blames us for not supporting students (B).

Teaching in itself is challenging as the student body has changed quite recently, requiring more time and attention from lecturers:

Colleagues agree that our students have changed. And that we need to be more responsive as our content and methods may be disconnected from who students are, we may need to change, we need a tighter connection. That is why we are here, to create this connection. It is frustrating when someone falls by the wayside (BC).

At the same time staff are required, somewhat unwillingly, to do research, but that this may be at odds with the requirements of teaching:

We felt very strongly that we have to do research, it is forced on us rather than what we wish for and if you don't you are not worthwhile in this department (D).

As things stand, neither research nor teaching appear to be particularly attractive to staff. Engeström and Sannino (2011, 375) describe these sorts of manifestation of contradictions in work as 'double binds', in which staff are repeatedly presented with 'pressing and equally unacceptable alternatives'.

In addition, staff often struggle with poor resourcing from the university, which they link to a lack of care from the university:

Also a big frustration is battling with resources, door handles, making lights go on. I also spend a lot of time on administration. This is a big frustration for me, just having to battle all the time with the university, they should be on our side, asking 'what do you need' (Y).

Staff then collectively begin to model their difficulties as being akin to a jam sandwich, with them as the jam being squeezed between the needs of the students and university management. The metaphor is expanded then to include a further pressure, that of industry and their needs. Such strong metaphors are typical manifestations of participants' experiences of conflicts (Sannino, Engeström, 2017). Such participant developed metaphors also act as a means to better grasp and understand their situation, or as an additional secondary stimulus to promote change (Sannino and Engeström, 2017).

In parallel with these manifestations of conflicts, there is an emerging and recurrent theme of care. This begins with staff stating their commitment to caring for students but that such care is not always reciprocated by students and management:

Maybe we try too much, invest too much care, we want to facilitate students, that is the sort of people we are (YG)

It is the care with which they do their tasks (for the entrance portfolio). It is dog eared, lacks care, on bits and pieces of paper and cardboard (BC).

The only female participant took a slightly different approach to care. She raised her difficulty with being in a mostly male workgroup, with a particular focus on how issues are discussed within an exclusionary 'boys club':

Of course, crazy and seemingly fab ideas are discussed over beers, whatever, that's all good. But decisions shouldn't be made there. Decisions should be made in a transparent way. I can only speak from my experience – as a woman in a boys' club. But all too often I'm not. I don't WANT entry to that club – I want a fair and transparent, caring environment. The boy's club is a legacy from the "good old days", which frankly weren't always good. Let's build something new.

She raises a particularly important issue, that the concept of care should not just be between students and management/admin outside of the department, but also within the department. She challenges the previous ways of doing things, the norms or culture of the department, that are not beneficial to staff's wellbeing. As Clegg (2008) points out, women in academia often rub up against the more normative masculinity of academic departments, and this appears to be the case in this workgroup. The other lecturers are initially resistant to acknowledging current gendered practices, eventually coming to realise that they do exclude the women in the department, and that this practice needs to change. This point is particularly evident in the post-CL follow up meeting (learning action 4).

Care also becomes a node for further development as the staff engage in analysis of the conflicts they find themselves in, as an approach to thinking through and possibly resolving something of these conflicts.

Learning action 2a: Analysis of the current situation on an activity system diagram

The facilitators and the staff collaboratively assign these conflicts to the nodes of their activity system. In this way conflicts can be understood as contradictions within and between the activity system nodes, and as systematic rather than individual or group difficulties. The system acts as a secondary stimulus to promote further learning. These systematic contradictions are marked with chevrons on Figure 3.

For staff, the *object* they are working on is both developing quality graduates and managements' need for increasing the quantity of graduates, even if staff do not think all students are ready to pass. This contradiction between quality and quantity may lead to an outcome of staff's lack of motivation.

Although staff are working on teaching and learning of their students, they feel that the *tools* they have at their disposal are mostly not adequate, for example lack of support from HR and finance and the general dilapidation of the building and its physical resources. Furthermore, administration takes much time, including email overloads, as does supporting and scaffolding students, such that staff feel they lack time for much reflection and also for research.

Successfully working on teaching and learning is also hampered by the *divisions of labour*, where management (as part of the *community*) takes a dominant role. Staff feel that their specialist knowledge and expertise as product designers is being usurped. The dominance of industry, another significant member of the community, which was strong in the past, has receded in favour of the influence of university management. Furthermore, students hold an expectation that they will be provided with high levels of support rather than having to take greater responsibility for their own, as was the case in the past.

This student expectation is seen as being in conflict with a student culture (*a tacit rule*) of self-motivation and developing independence in their learning, which further acts against successfully moulding 'the competent designer'. Whereas staff see themselves as caring for their students, through supporting them in appropriate ways, they experience the university as holding them accountable for student failure, even where it is no fault of their own (blaming culture). In addition, the university rules on teaching and learning apply to all departments such that the particular needs and ways of operating of product design are not necessarily recognised.

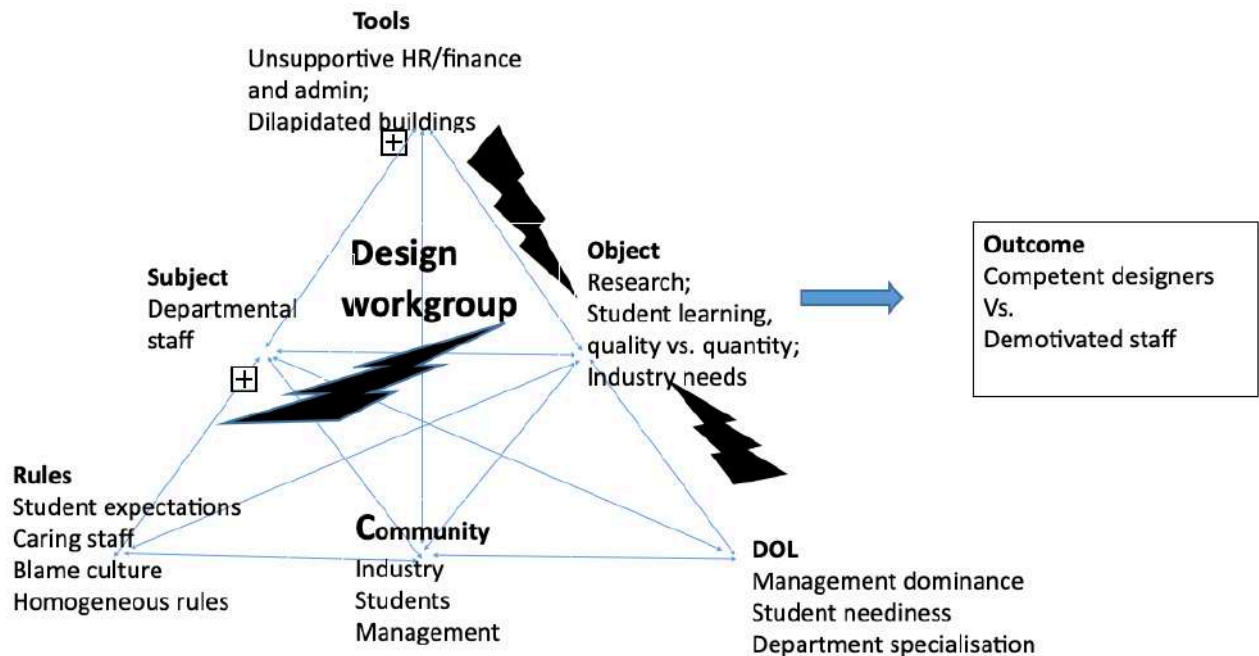


Figure 3. Activity system of the Design workgroup showing tensions as systematic contradictions

Learning action 2b: Historical analysis of Product Design: working with the main contradictions

Each element (tools, object, rules, dol) of the system being analysed is examined at different time periods. Then what has changed the most and what has changed the least can be identified. In this workgroup the object of working on students towards creating competent graduates who can make an impact on society has remained constant, ‘everything else seems to have changed, it is like a new activity system’ (as one participant put it). In the past there was a strong departmental identity and a sense of autonomy with good access to resources and strong industrial linkages. As the participants suggest:

We felt we were part of something, a weird non-specific coolness. Well known designers and industry would talk to us and (some of us) also visited Sweden, it was awesome.

This enthusiasm, they felt, was also transmitted to the students. Now, however, they have lost their specialist departmental status and been homogenised, access to resources is made difficult by red tape and problematic student and institutional expectations have led to ‘care fatigue’. Furthermore, there has been significant change in the student body, with more open criteria for programme access and massification.

Learning action 3: Modelling the new situation

The facilitators were conscious of recurring themes emerging such as lecturers’ fairly negative views of students’ abilities and attitudes and their own concern with the concept of care. In change laboratory work the facilitator may provide the participants with critical readings on issues emerging, in order to stimulate more in-depth discussion (Virkkunen and Newnham, 2013). For example, short readings on students’ interests/abilities and the ethics of care (Tronto, 1993) were discussed.

Lecturers then developed the ideas that students may bring new ways of thinking with them, and that staff should be more flexible in their approaches to including others' ideas into the curriculum. The curriculum approach, they suggest, should start where the students are, but 'not changing the goalposts, just the starting point and processes'. Furthermore, staff see a need to give value to student work through, for example, exhibitions of student's work (these do happen but often only later in their career), and to assist students with development plans from first to final year. On care staff describe how students do not necessarily know what is expected of them, and how this may be different when they work professionally, work as students or within normal social life.

Thereafter the facilitators and participants collectively pick up on the idea of creating a new, possible activity system for the programme that can assist the participants in resolving the conflicts and contradictions raised in the first two days. This is shown in Figure 4.

Care is matched by the introduction of a new possible object, that of a diverse group of students with different abilities, needs and advantages. Rather than seeing these students as problematic, they are potential resources or tools of new knowledge. It would be useful, therefore, to start with what do they know and bring to the classroom, and how this be developed in the form of a development plan for the student.

An emerging new possibility for 'rules' was a care code of conduct between students and staff. The concept of a 'care code' is first taken up as an important tool and rule in the new activity system, as one which can bridge between the needs of staff, students, industry and the institutional management and administration. In addition, attention needed to be paid to attentiveness and responsibility (Tronto, 1993) of staff to one another.

Hopefully, the programme would also like to develop a culture of flexibility and resilience amongst themselves and the students. In terms of community, participants highlight the importance of bringing the university administration on board, so that there is collaboration towards a common goal of developing competent designers to improve society. Administration would include closer connections, possibly in the form of regular meetings and updates, between the university's funding department and teaching staff (following up on funding has been an arduous and time consuming administration task in the past). A further vision for the improved division of labour is the creation of greater programme autonomy, though it is not clear how this will be accomplished (see Figure 4).

At the end of day 3, after 6 consecutive change workshops, the participants and facilitators left on a very positive note. What had initially been seen as immovable difficulties were now seen differently. There was the possibility of resolving these often 'paralysing conflicts of motives' (Engestrom, Nuttal and Hopwood, 2020: 2) through using learnings developed in the CL. As one participant observed:

What is interesting in the triangle is that there are lots of tools available to us now that we didn't have, that were not visible at the beginning. I look at the current situation we had which was very negative compared to what we have now. And the thing we did not really do anything with was the object, what we are creating, and the subject, who we are, and the community we are working in. It is these external things that we can do (that we can work on) which is great (D).

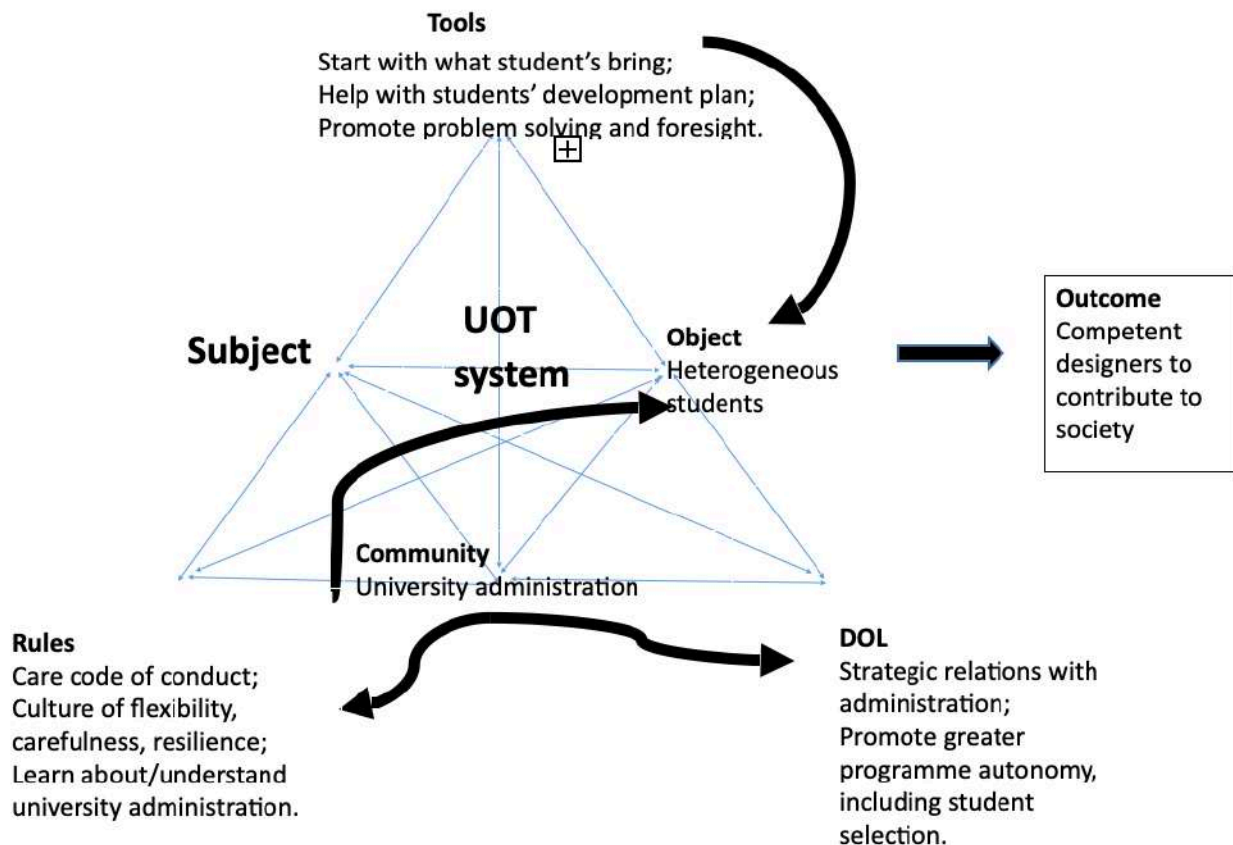


Figure 4. *Modelling the new activity system.*

Learning action 4: Examining the model

10 months after the workshops were completed, the facilitators returned to the departmental participants, to gain an indication of the extent to which visions developed had found purchase within the programme:

The CL made us aware what was in the back of our heads. It was having that platform. Let us all sit down in a room and make some mental space, and it does not work with lots of clever people, everybody needs to be on board and that is what happened in the CL. It did shake things up and it challenged the status quo, something like this is useful to see what falls out. I feel like this (CL) has made us step back and look at things from a different perspective, and this is how the boys club thing got exposed, you need fresh eyes on it (D).

What we did was really good, that care code of conduct, we want to write it up, everybody can bounce off that, it is definitely going to help us speak to students in a more focussed way (BC).

These comments suggest that staff did find the CL to be a conducive space to challenge the current conditions and develop new ways of addressing problems.

4. Discussion and conclusions

In change laboratory work there is a focus on difficulties in working life, in particular difficulties that appear to be insurmountable, and these become the impetus and source for new ways of thinking and doing that can resolve these difficulties.

Sannino and Engeström (2017) describe the emerging conflicts and their analysis as contradictions as the ‘pushes’ for the participants towards new ways of thinking and doing, or new possibilities. The new model of the activity system for the future is then potential ‘pull’ towards realising these new possibilities. As they stand the elements of the new model (care, diverse students and an enlarged community) are only emerging new possibilities. Over time they may become ‘germ cells’ as they are developed and experimented with. Germ cells are new concepts or processes that act as bridges between identified contradictions, and may serve to resolve these contradictions. They ‘open(s) up rich and diverse possibilities of explanation, practical application, development, and creation ...’ (Sannino and Engeström, 2017: 83).

Furthermore, Pleschová, Roxå, Thomson and Felton (2021) suggest that one problem with academic development work is that there is a focus on rigour and being credible, so mitigating against engaging with doubt, uncertainty and the sorts of ‘wicked’ problems beset by staff. They put forward the need for conducive spaces of mutual trust and caring, in which new knowledge can be constructed. We suggest that CL, through developing staff’s abilities to raise, confront and work with problems and so assert their transformative agency (Kerosuo, Mäki and Korpela, 2015), is one such space.

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This article is an early, redacted and substantially different version of a much longer article in review in the journal Alternations.

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Section D

**Student views,
attitudes & needs**



15. Responsive Assessment: Understanding Learners' Educational Needs

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Abstract. This paper seeks to explore the concept of responsive assessment and its impact on understanding learners' educational needs. It delves into the numerous benefits of responsive assessment with regard to learners' learning objectives (Black and Wiliam, 1998) and suggests tools and strategies for its implementation (Wiliam and Thompson, 2007). It also highlights the positive aspects it brings to teachers and assessors (Wiliam, 2011).

Additionally, the paper discusses culturally responsive assessment, its importance, and its applicability in standardised tests (Darling-Hammond, 2007) since it is a form of assessment that takes a learner-centred approach, being tailored to accommodate individual differences and diverse cultural backgrounds (Gay, 2010).

Keywords. *responsive assessment, culture, standardised tests, implementation, positive impact*

1. Introduction

Assessment is a critical component of the education system, guiding both teachers and learners towards achieving the learning objectives set (Wiliam et al., 2004). Traditional assessment methods often fail to capture the diverse needs of students, leading to discrepancies in their educational outcome. Why should assessments be responsive? According to Mary Henning-Stout (1994) “Responsive Assessment **offers a way of rethinking academic assessment that can remove the barriers to learning**--including those blocking a learner's sense of dignity as a person who has knowledge and is capable of learning--and serve to truly support people who learn”. Responsive assessment offers a solution by acknowledging the uniqueness of each learner and adapting assessment accordingly (Guskey, 2009), while, at the same time assists in the evolution of teachers both as individuals as well as professionals (Stiggins et al., 2007). By personalising learning, enhancing engagement, providing targeted support and promoting real-world application, responsive assessment ensures effective education. Strategies like formative assessment, project-based tasks, self-assessment, and technology integration can facilitate its implementation and form part of the strategies to which this paper will refer to. While achieving fully culturally responsive standardised tests may be complex, efforts to minimise cultural bias can lead to fairer evaluation and a more inclusive educational system. Responsive assessment does not seek to annihilate standardised/traditional testing methodologies but can present a viable and promising approach to enhancing them. By tailoring assessment to students' diverse needs, interests, and cultural backgrounds, responsive assessment can foster a more inclusive, engaging, and equitable learning environment. Even if challenges in implementation may exist, evidence from research on culturally responsive pedagogy supports the feasibility and potential benefits of responsive assessment. To fully exploit its advantages, educators and schools need to invest in professional development and create a supportive ecosystem that embraces responsive assessment practices. With a balanced approach that values both standardisation and responsiveness, responsive assessment can pave the way for more effective, relevant, and student-centred evaluation of learning, thus, alleviating some of the stress related to the notion of “assessment”.

2. Literature Review

Responsive assessment is a learner-centred approach to assessment that recognizes and respects the individuality of each student (Wiliam and Thompson, 2007). It seeks to align assessment with learners' interests, cultural backgrounds, and learning styles, promoting engagement and motivation (Black and Wiliam, 1998). By providing personalised learning experiences, responsive assessment enhances understanding and knowledge retention (Su and Reeve, 2011). Studies have shown that responsive assessment has numerous benefits for learners. Personalised learning experiences result in increased engagement, active participation, and a sense of ownership in the learning process (Lee, 2007). Targeted support, facilitated by ongoing formative assessment, leads to improved academic performance and a more conducive learning environment (Popham, 2008). Furthermore, exposure to real-world application in assessment prepares learners for practical problem-solving and future career success (National Research Council, 2014). Implementing responsive assessment involves various tools and strategies, i.e. project-based assessment that could incorporate culturally relevant content and promote critical thinking and creativity (Emdin, 2016). Also, encouraging self-assessment and reflection empowers learners to take charge of their education and develop metacognitive skills (Hattie, 2009). Lastly, integrating technology in assessment enables personalised learning experiences and efficient progress tracking (Wiliam, 2011).

2.1 Positive Aspects for Teachers/Assessors

Responsive assessment positively impacts teachers and assessors in various ways, fostering a student-centred and culturally relevant educational environment. Ladson-Billings (1995) suggested that implementing responsive assessment provides teachers with a deeper insight into their students' strengths, challenges, and cultural backgrounds, allowing for more effective instructional decisions. Elaborating on that, Guskey (2009) asserts that enhanced understanding of individual learners, increased job satisfaction, empowerment in instructional decision-making, and continuous professional growth are some of the key benefits for educators. By embracing responsive assessment, educators not only create a more inclusive and engaging learning environment but also develop a deeper connection with their students, leading to improved academic outcomes and holistic development.

Enhanced Understanding of Individual Learners

Responsive assessment enables teachers and assessors to gain a deeper understanding of each student's learning needs, strengths, and challenges (William and Thompson, 2007). By adopting assessment methods that align with learners' interests and cultural backgrounds, educators can tailor their instruction more effectively. As teachers become more attuned to their students' unique characteristics, they can offer targeted support and interventions to promote academic growth (Guskey, 2009). This personalised approach fosters a stronger teacher-student relationship, leading to improved communication and mutual respect. It is necessary for teachers to understand students *first* before they accurately understand students' knowledge. Moreover, Ladson-Billings (1995) advises that to effectively help students in the classroom, it may well necessitate understanding them both as people and becoming familiar with their culture as well. This process might as well influence not only our teaching practices but it can also lead to the creation of culturally relevant assessment, as will be elaborated further ahead in this paper.

Increased Job Satisfaction

As a result of the ideas mentioned previously, seeing tangible evidence of student progress and growth through responsive assessment contributes significantly to teachers' job satisfaction (Guskey, 2009). When educators witness the positive impact of their efforts on learners' development, they feel a sense of fulfilment in their profession (Stiggins et al., 2007). Responsive assessment allows teachers to witness the direct results of their teaching strategies, reinforcing their belief in the value of their work, partially lifting the stress everything associated with the strict sense of assessment has. The negative backwash effect of standardised testing can be minimised and teachers return to teaching, allowing themselves to feel “free” from teaching to the test. Experimentation, new methodologies and strengthening the bonds between themselves and their students allow teachers to feel deeply satisfied with the end product of their profession.

Empowerment in Instructional Decision-Making

As teachers become more aware of learners' individual needs through responsive assessment, they gain the confidence to make informed instructional decisions (Ladson-Billings, 1995). The insights gathered from assessment guide educators in adjusting their teaching strategies to suit diverse learning styles and preferences (William, 2011). Armed with this information, educators can differentiate instruction effectively to meet the diverse learning needs of their students (Su and Reeve, 2011). The ability to tailor lessons based on students' performance levels and individual interests helps create a more inclusive and engaging learning environment.

Continuous Professional Growth

This empowerment in instructional decision-making contributes to teachers' sense of professionalism and efficacy, encouraging them to refine and improve their teaching methods continually. Implementing responsive assessment methods requires teachers and assessors to adapt and develop new skills (Popham, 2008). Therefore, on the one hand, educators embrace the challenge of integrating innovative assessment strategies and technologies that better serve their students' learning needs. On the other hand, engaging in ongoing professional development to implement responsive assessment techniques enhances teachers' expertise and improves their overall teaching practices (Wiliam, 2011). This pursuit of continuous growth and learning ensures that educators remain updated with best practices and current educational trends.

Promotion of Culturally Relevant Pedagogy

Responsive assessment encourages teachers and assessors to incorporate culturally relevant content and assessment that resonate with their students' backgrounds (Gay, 2010). By acknowledging and celebrating students' cultural identities, educators foster a positive learning environment where all learners feel represented and valued (Lee, 2007). Culturally responsive assessment eliminates bias and ensures fair evaluation, further enhancing teachers' effectiveness in meeting diverse student needs (Darling-Hammond, 2007). Designing culturally inclusive learning experiences can help learners interact effectively with information through a transcultural perspective and recognise their own identities. Culturally Responsive Practices (CRP) are fundamentally about teaching in accordance with how students learn. According to Harvard University Social Ethics professor Mahzarin Banaji, "the quickest way to define what implicit bias is [is] to say it is the thumbprint of the culture on your brain." For educators, this means that our inherent ideas of what constitutes quality education come from our personal experiences. In order to be effective, we must think differently from how we typically do, so that we can address our students' needs and help them evolve via their cultural ways of knowing, being, and learning.

The promotion of Culturally Relevant Pedagogy renders culturally responsive assessment quite necessary in the present day classroom and teaching practices, as will be elaborated towards the end of this paper.

2.2 Responsive Assessment in Standardised Tests

Responsive assessment in standardised tests is a complex yet significant undertaking. By acknowledging students' diversity and incorporating elements of inclusivity, standardised tests can become more equitable and valid measures of student achievement. Striking a balance between standardisation and responsiveness ensures that the assessment maintains reliability and comparability while being sensitive to the unique backgrounds and learning needs of students. With ongoing efforts to address biases, stereotypes, and linguistic diversity, responsive assessment can pave the way for more inclusive and fair educational systems that promote success for all students.

Standardised examinations are designed to assess students' knowledge, abilities, and aptitude in a consistent manner, allowing for comparisons across different students and educational settings. Even though they are associated with some advantages, especially when we refer to validity and reliability, standardised examinations tend to be negatively associated with the notion of fairness and inclusion (Darling-Hammond, 2007). The inflexible structure and one-size-fits-all approach may fail to take into account pupils' different cultural backgrounds, linguistic ability, and personal learning styles. As a result, standardised assessment may not adequately represent the breadth of pupils' talents, perpetuating educational inequities.

For a variety of reasons, responsive assessment may bridge this gap. In the first place, culturally relevant material can be associated with it and can be part of it. By incorporating culturally relevant content into standardised examinations, students from varied cultural backgrounds can find them more accessible and relatable (Gay, 2010). Incorporating examples, scenarios, and tasks that reflect students' cultural experiences can boost participation while decreasing cultural bias. Furthermore, standardised examinations could be offered with flexibility to meet the different requirements and preferences of pupils (Wiliam and Thompson, 2007). Providing several testing dates, extended time, or the chance to take the test in alternative formats can help all students feel they are offered equal opportunities while being assessed.

At the same time, especially in language tests, dealing with linguistic varieties is of key importance in standardised assessment. To guarantee that language proficiency does not pose an obstacle for students' skills and abilities, it may be possible to enable bilingual dictionaries or provide linguistic support for English language learners (Darling-Hammond, 2007). Last but not least, according to some academics, prejudices and bias are reinforced by standardised exams, especially when it comes to socioeconomic and cultural aspects (Lee, 2007). Test designers can address these issues through responsive assessment by checking test items for potential bias, improving and, simultaneously, safeguarding the fairness of the test.

Nonetheless, incorporating responsive assessment in standardised tests can be associated with numerous challenges. Responsive assessment may have practical challenges.

One of the challenges lies in tests maintaining their standardised nature while addressing individual differences (Wiliam and Thompson, 2007). Striking this balance is essential to ensure that standardised tests remain a reliable measure of student achievement while being sensitive to students' diverse backgrounds and learning needs.

To maintain the validity and reliability of standardised tests, careful attention must be paid to the adaptation process. The incorporation of responsive assessment elements should not compromise the consistency and comparability of scores across different administrations and populations (Darling-Hammond, 2007). Establishing clear guidelines for the inclusion of responsive elements and conducting extensive pilot testing can help ensure that assessment remains valid and reliable. Adding to that, implementing responsive assessment in standardised tests requires training and professional development for educators involved in the test development process (Ladson-Billings, 1995). Educators must first understand the principles of cultural responsiveness and inclusivity before creating the corresponding assessment.

Feedback from educators, students, and stakeholders is vital in refining responsive assessment elements in standardised tests. Regularly gathering feedback on the inclusivity and fairness of test items and administration practices can lead to continuous improvement (Wiliam and Thompson, 2007). The iterative nature of test development allows for adjustment that responds to the changing needs of the student population.

2.3 Implementing responsive assessment strategies

For us to create a student-centred learning environment that serves the different requirements of learners, we must adapt our approaches and tactics to include the aforementioned notions. Teachers can promote a diverse and adaptable educational experience by focusing on formative assessment, including performance-based tasks, supporting self-evaluation, and using technology. The effectiveness of responsive assessment is further increased by culturally appropriate assessment, differentiated education, and student participation in the assessment design process. Educators may

make sure that tests are effective as learning aids by investing in ongoing professional development and making a commitment to giving students timely feedback.

There are multiple methods/strategies promoting responsive assessment, some of which follow.

First of all, **formative assessment** is an effective method for carrying out responsive assessment. Teachers might modify their instruction to fit specific learning needs by frequently collecting feedback on students' progress and comprehension of material (Black and Wiliam, 1998). Quizzes, dialogues, and other forms of formative assessment may provide teachers the chance to modify their lesson plans when necessary, resulting in a dynamic and adaptable learning environment. Additionally, projects, presentations, and portfolios used in **performance-based assessment** are in line with the fundamental ideas and practices of responsive assessment. Through practical applications, these enable students to demonstrate their knowledge and abilities (Emdin, 2016). Students get the chance to exhibit their knowledge in a variety of ways through performance challenges, which take into account various learning preferences and styles.

Another methodological adjustment is **promoting self-assessment and reflection**, thus, empowering students to take ownership of their learning and development (Hattie, 2009). By regularly evaluating their progress, strengths and areas for improvement, students become more aware of their individual learning needs. Teachers can facilitate this process by providing guiding questions and rubrics to help students assess their work effectively. **Educational technology** can offer valuable resources for implementing responsive assessment. Digital tools, learning management systems and online platforms can facilitate personalised learning experiences (Wiliam, 2011). These technologies enable teachers to track students' progress, identify areas of concern, and provide targeted support in a more efficient and timely manner.

Responsive assessment goes hand in hand with **differentiated instruction**. Differentiating instruction based on students' readiness, interests, and learning profiles ensures that assessment aligns with their individual needs (Tomlinson, 2001). Tailoring instructional approaches and assessment methods enables teachers to provide the right level of challenge and support to each student. Another quite effective strategy is **involving students in the assessment design** process, allowing them to have a sense of ownership and agency (Wiliam and Thompson, 2007). When students have a say in how they will be assessed and what criteria will be used, they become more invested in the learning process. Engaging students in the assessment design encourages them to reflect on their learning goals and become active participants in their education.

2.4 Employing a variety of assessment methods helps capture a more comprehensive picture of students' learning (Popham, 2008). Multiple assessment methods reduce the reliance on a single high-stakes test and promote a holistic understanding of student learning. **Feedback** is an integral part of responsive assessment. Timely and constructive feedback helps students understand their strengths and areas for growth (Hattie, 2009). Regular feedback enables students to make adjustments in their learning and build on their achievements, promoting a growth mindset.

2.5 The Feasibility of Responsive Assessment

Weighing on its benefits and challenges, it is reasonable to question ourselves as educators whether it is feasible to incorporate responsive assessment into our everyday teaching practices and assessment design, as far as practicality is concerned. Adjustment, adaptability and versatility may well be the answer. When implemented effectively, responsive assessment can lead to fairer and more inclusive evaluation of our students.

Responsive assessment can be practical even in the context of standardised assessment (Darling-Hammond, 2007). Responsive assessment can complement standardised tests by incorporating elements of inclusivity and cultural relevance (ibid). Including diverse content and providing accommodation for linguistic and cultural differences can help minimise bias and improve the validity of standardised assessment (Lee, 2007). Practical steps include pretesting to identify potential biases and offering multiple administration options to cater for diverse student needs (William and Thompson, 2007).

Furthermore, the use of technology can streamline test administration and data analysis, making standardised assessment more efficient and informative (William, 2011). Digital tools and learning management systems facilitate the collection and analysis of assessment data, streamlining the process of identifying students' progress and areas for growth. Additionally, interactive and adaptive assessment is facilitated by technology, allowing teachers to more effectively give students individualised feedback and guidance.

Traditional tasks, such as essays, reports and exams, can be modernised and address present day needs if they incorporate responsive assessment practices. Emdin (2016) claims that teachers can offer students assessment opportunities in which their interests and their cultural background can be voiced. By combining traditional assignments with responsive assessment elements, educators create more meaningful and engaging learning experiences. Striking a balance between responsiveness and standardisation is crucial to ensure consistency and fairness in assessment practices. Developing clear assessment guidelines and rubrics can provide a framework for educators to maintain standardisation while accommodating students' diverse needs (William and Thompson, 2007).

Responsive assessment can be practically applied through real-world applications and project-based assessment (Emdin, 2016), as was previously mentioned. These approaches allow students to demonstrate their learning in meaningful contexts, making the assessment more engaging and relevant. Students can work on projects that align with their interests and cultural backgrounds, fostering enthusiasm and investment in the learning process.

Stiggins et al (2007) pose the questions of time constraints, resource limitations, and resistance to change. It is us, educators, who must find practical solutions to address these challenges, as a first step. Moreover, advocating for increased resources and professional development initiatives (William, 2011) can facilitate the process of moving towards responsive assessment. However, the authorities' assistance would be of immense value should they decide towards integrating responsive assessment into existing curricula and assessment schedules, as this might help alleviate some of the aforementioned obstacles.

2.6 Culturally Responsive Assessment

One last thing that is worth being presented in this paper and which is in direct link to the idea of responsive assessment is culturally responsive assessment. As mentioned before, research on culturally responsive pedagogy provides evidence of the feasibility and positive outcomes of responsive assessment practices. Studies have demonstrated that culturally responsive pedagogy leads to improved academic achievement, reduced dropout rates, and increased student engagement (Ladson-Billings, 1995) as it focuses on recognising and valuing students' cultural identities, which aligns with the principles of responsive assessment (Gay, 2010).

Culturally responsive assessment, therefore, is an integral aspect of responsive assessment. It involves integrating culturally relevant content into assessment and ensuring test administration is

flexible to accommodate diverse cultural practices (Darling-Hammond, 2007). Inclusive content helps students from various cultural backgrounds feel recognized and valued (Gay, 2010). By recognizing and valuing students' cultural identities, incorporating culturally relevant content, and addressing linguistic diversity, educators can develop assessment that is fair, relevant, and respectful of students' diverse backgrounds (Ladson-Billings, 1995). Culturally responsive assessment fosters an inclusive learning environment where all students can thrive academically and personally. As educators adopt this strategy, they assist in the creation of culturally competent people who can thrive in a world that is becoming more and more varied and interconnected.

In order to represent cultural differences in teaching and learning, culturally responsive assessment requires a fundamental change in assessment practices (Gay, 2010). It does not simply require the use of diversified content in assessment. By implementing culturally sensitive assessment practices, educators hope to reduce biases, break down barriers between cultures, and foster an inclusive learning environment.

The acknowledgement and appreciation of students' cultural identities is essential to culturally responsive assessment (Lee, 2007). In order for students to feel like they are represented in the content and questions, assessment should take into account their varied cultural backgrounds (Gay, 2010). Students feel like they belong when their cultural backgrounds are acknowledged and valued, and they are more likely to participate actively in the evaluation process. This might apply to anything that illustrates the cultural experiences of the students. By ensuring that students can relate their existing knowledge and experiences to the assessment activities, assessment that is culturally relevant makes the evaluation process more authentic and meaningful.

A potent approach for fostering inclusion and fairness in education is culturally responsive assessment (Gay, 2010). Educators can minimise the achievement gap and guarantee that all students have an equal opportunity to demonstrate their knowledge and abilities by recognising cultural variations and modifying their assessment practices to meet the requirements of their students (Darling-Hammond, 2007). As a result, a more welcoming and encouraging learning atmosphere is created, where all students feel respected and empowered.

Similar to responsive assessment, culturally responsive assessment can be incorporated into a variety of assessment approaches, such as formative assessment, summative assessment, and performance-based assessment (William and Thompson, 2007). To put it briefly, educators can utilise the former to gather continuous feedback and modify instruction to suit the various requirements of pupils. Performance-based assessment, such as projects and presentations, allows students to demonstrate their understanding using culturally relevant contexts and content. The latter, summative assessment, can be designed to reflect cultural diversity, ensuring fair evaluation of students' learning outcomes.

As aforementioned, while fully integrating culturally responsive assessment into standardised tests cannot come without being challenging, taking steps to minimize cultural bias is crucial (Lee, 2007). Regular review and revision of standardised tests can include culturally relevant content and the exclusion of stereotypes (National Research Council, 2014). Moreover, offering flexibility in standardised test administration can ensure fair evaluation (Darling-Hammond, 2007).

As regards teachers/assessors, implementing culturally responsive assessment requires educators to develop their cultural competence (Ladson-Billings, 1995). As it has been previously highlighted, teachers should engage in continuous professional development to understand the cultural backgrounds of their students better and adapt their teaching and assessment practices accordingly.

Culturally competent educators are better equipped to address students' diverse needs, foster positive classroom environment, and promote social-emotional well-being.

3. Conclusion

Responsive assessment is a practical approach that aligns with the principles of personalised and inclusive education. By recognising individual learners' needs, cultural backgrounds, and learning styles, responsive assessment offers a practical path to enhancing traditional evaluation practices. Through formative assessments, culturally relevant content, and technology integration, educators can implement responsive assessment strategies effectively. Moreover, practical steps such as professional development, parent engagement, and project-based assessments contribute to the successful integration of responsive assessment in classrooms. By embracing responsive assessment, educators can create learner-centric environments that support students' academic growth, foster inclusivity, and prepare them for success in a diverse world.

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16. ASPETE (Athens) students' views on the connection between theory and practice in the context of their micro-teaching

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Abstract: The purpose of this research is to record the views of students/candidate teachers of ASPETE on the opportunity provided by the theoretical courses taught in previous semesters to implement Microlearning in later semesters. Specifically, the research questions focused on whether the teaching of the Teaching Methodology and Educational Evaluation lessons how were facilitative for the application of the micro-teaching courses they did in later semesters. First, we conduct a literature review of

other studies on related topics, and then present the methodological framework of this study. Our research tool was 12 semi-structured interviews (male and female) students under epistemological lens of the interpretive paradigm. Then we analyzed data by coding process. Finally, we present, in detail, the findings of the exploratory process and focus on the students' suggestions regarding teaching environments, which, in their opinion, would effectively contribute to their familiarity with the organization and implementation of microteaching. The findings may be particularly useful to academic lecturers and may contribute to the formulation of a new academic teaching perspective in order to make the students' transition from theory to practice more effective.

Keywords: *Theoretical training, Teaching Methodology, Pedagogical Evaluation, Interface and Transformation of Theory into Practice, Microteaching.*

1. Introduction

The modern social and educational environment operates in a context of constant change, modification and reversals. This finding also requires the continuous renewal of the educational system, part of which is the training of prospective teachers and the continuous education of senior teachers (Chatzopoulou, 2014). Therefore, both teacher education and university pedagogy are interesting scientific topics internationally. Particularly in recent years, there has been scientific interest in teacher education in the context of University Pedagogy. More specifically, teacher development in higher education through taught courses is now widespread in many countries around the world. In some countries, in fact, the programmes are compulsory for academic staff who start teaching academic students. The aim of these programmes is usually to improve the quality of student learning through changes in teaching (Trigwell, et al, 2012).

According to the above, we believe that it is of scientific interest to study techniques and practices that contribute to linking theory and practice in order to make students' education more participatory and creative. This is exactly the focus of the microteaching technique, which is found in many academic departments both in Greece and in other countries that train future teachers, and which has been studied a lot in the last 50 years (Fernandez, 2010; Msimanga, 2020; Danday, 2021; Sophos, et al., 2013; Karaminas, 2010).

However, although the practice of microteaching has been studied through various studies internationally, mainly in terms of its effects on the trainee or practicing teacher, the way of connecting the theoretical lessons taught to students with their practical application in the context of microteaching is absent from the literature, given that the practical training through microteaching offers students the opportunity to put into practice what they have been taught in theory.

In the context of this reasoning, the present study aims to investigate the views of the students of ASPETE, regarding the readiness offered by the theoretical courses of previous semesters, to plan, organize and generally be ready to implement their microteaching in subsequent semesters. At the same time, we focus on the students' suggestions, which could be a tool for utilization in the context of University Pedagogy.

2. Literature Review

The background theory: the pedagogical training of students in the context of university pedagogy

The pedagogical knowledge and teaching training of students of the Pedagogical Department of ASPETE is required to fulfil their role as future teachers. The goal of the course is to familiarize them with issues of teaching methodology, learning and teaching. Specific objectives are to acquire knowledge about teaching methods and teaching techniques, to familiarize them with quality teaching and learning practices, with assessment practices, based on the level of readiness, learning needs and social characteristics of students.

These specific objectives open up fields of dialogue with according to the principles of postmodern pedagogy, teaching methodology tends to build a system of knowledge production and application that is evolving and dynamic. Such an approach requires through educational environments that foster communication and feedback between teachers and students (Fridaki 2009, pp. 237-238). The ultimate goal of the above is to maximize the effectiveness and quality of teaching work, with techniques that allow access to knowledge, creating an evolving learning environment that offers learning experiences through the construction of mental schemas while also utilizing pedagogical and social interaction.

Modern higher education, whose mission is multilevel, must move within this framework. According to modern approaches to the role of higher education, the role of academic institutions is not limited to the promotion of scientific research and scientific knowledge, but is now considered equally important to provide quality teaching and the development of integrated personalities, who are characterised by critical thinking, academic ethics and a sense of social responsibility (Gougoulakis, Economou, 2014). This is why in recent years there has been talk of University Pedagogy or University Didactics, which focuses on the knowledge, skills and abilities that academic teachers need to help their students learn, successfully connect theory with practice and cultivate themselves more broadly. It is therefore clear that the role of the university teacher is not limited to imparting knowledge of his or her discipline or other general theoretical models and conceptual tools of analysis, but must also be didactically qualified to meet the contemporary demands of academic teaching practice. (Gougoulakis, Economou, 2014).

This was confirmed by the findings of the EU High Level Group (HLG) on the modernization of higher education on improving the quality of teaching and learning in universities (High Level Group, 2013) (http://ec.europa.eu/education/higher_education/doc/modernisation_en.pdf). In particular, the HLG points out that effective teaching and quality enhanced learning environments encourage students to develop confidence in their creative abilities, with a strong sense of social responsibility and a realization that learning is a lifelong process. Therefore, the quality of teaching is crucial for students' academic progress, performance, opportunities and choices either during their studies or in the labour market) (http://ec.europa.eu/education/higher_education/doc/modernisation_en.pdf).

Therefore, when the focus is also on effective university teaching, future professionals will have a deeper understanding of their field knowledge and be familiar with practices of their profession (Bernstein, 2012; Chick, et al, 2012). In such a context, prospective student teachers are required to acquire proficiency in "critical aspects of fundamental dimensions of their field - to think, perform, and act with integrity" (Shulman, 2005, p. 52). To respond proficiently to these three dimensions, graduates are required to learn and understand not only the theory, but also to apply this knowledge to practice (Shulman, 2005). In the teaching profession specifically, a teacher must have both content knowledge and pedagogical knowledge and skills to teach the subject matter (<https://doi.org/10.5206/cjsotl-rcacea.2018.1.8>).

One such practice which aims to link theory and practice and is used internationally in many University Teacher Education Programs, is the practice of Microteaching, which we investigated in this study to see students' views on the help it provided to enable them to move from theoretical knowledge to its practical use. We believe that the students' observations, as well as their suggestions, can be taken into account in University Pedagogy programs and promote more effective teaching of academic teachers.

Research on the practice of micro-teaching

It is already known that the inventors of Microteaching are Allen and Ryan, who define it as a teaching technique that provides an educational environment suitable for familiarizing pre-service teachers with the regular classroom (Allen, and Ryan, 1969). More specifically, it is a laboratory exercise lasting 5 to 30 minutes, depending on the model followed at the time, in which the teacher candidate teaches a limited instructional unit to a small audience of fellow teacher trainees in order to familiarize him or her with specific teaching skills and pedagogical approaches. A key element of the micro-teaching is its video recording, so that, in addition to the trainees, the teacher has the opportunity to watch a video of him/herself as a teacher, immediately after the teaching has taken

place or later, and to reflect on it. After the observation, comments and judgments from the trainees and the supervising pedagogue follow (Hatzidimou, 1997; Kouyiourouki, 2003; Giannakopoulou, 2008). Through this practice of microteaching, trainees have the opportunity and under the supervision of a supervisor, to use certain skills and receive feedback on their teaching and pedagogical behavior (Darwish, Sadeqi, 2016).

Subsequently, some contemporary studies on micro-teaching will be presented as a theoretical background to this research.

A study that found the effectiveness of micro-teaching in terms of lesson planning. In this study, the contribution of micro-teaching to the stimulation of the confidence of the prospective teachers was Emphasised. That's why students argued that it should be included in other years of study and not just in the last (Bakir, 2014).

In another experimental study by Zahid, Khanam, (2019), It was found that the participation of teachers in the micro-teaching had improved the skills and performance of the teachers and modified their teaching practices through reflection that they have received. Finally, the findings led to the revision of educational interventions and strategies and the methods of microteaching were further improved (Zahid, Khanam, 2019).

The research conducted at Flores University in Indonesia, which studied the results of remote microteaching during the Covid-19 pandemic, is also interesting. Although Microteaching did not take place in person, but through an online platform, it was the students who also benefited from the process. They learned to actively use their skills, organize lesson plans and adapt to specific conditions (Nasar, Kaleka, 2020).

In conclusion, we understand that the practice of microteaching is a key element of education that provides the opportunity for teaching practice for those destined to become teachers and its place in education is essential. However, despite many published international researches on microteaching, what is mainly considered is the effectiveness of microteaching in the acquisition of teaching and pedagogical skills of prospective teachers, but there is a lack of literature and research on the effectiveness of microteaching about how it helps to transform theory into practice. This is the dimension that this research aims to address.

3. Research methodology

Objective and Research Questions

In the present study, the researchers tried to investigate the views of the students of ASPETE Athens, on the extent to which the pedagogical courses, and in particular those of Teaching Methodology and Educational Evaluation taught in previous semesters, were useful in order to familiarize themselves with the design, organization and implementation of the microteaching exercises they had to implement.

Thus, the following research questions emerged:

- 1) Was the students' theoretical training in the courses of Teaching Methodology and Educational Evaluation, as well as in other pedagogical courses, sufficient and helpful for them to organize and implement their micro-teaching?
- 2) What do they suggest to integrate in the teaching of the theories in order to be more familiar with the implementation of microteaching?

Method

The research was qualitative, under the lens of the interpretive epistemological paradigm, because we focused on understanding students' views (Scotland, 2012). The choice of qualitative research and interviews, as a research tool, allowed us to analyse students' perceptions and opinions more deeply. For this reason, qualitative research is common in educational research (Robson, 2010), as it is flexible and allows for a holistic understanding of the topic to be investigated (Creswell, 2016).

As mentioned, the research tool used was a semi-structured interview, 12 questions, on average 30 minutes, with open-ended questions, and in accordance with all the protocols for conducting the research (obtaining consent, communicating the research protocol to the participants). This instrument was chosen due to the fact that we were interested in the students' in-depth views (Robson, 2010). These interviews lasted from October 2022 to December 2022.

Sample

In the present study, 12 students (7 females and 5 males), from the 7th semester of the Department of Mechanical Engineering and from the 9th semester of the Department of Civil Engineering of ASPETE Athens were interviewed. These students had already attended the theoretical courses that the research examines, so they can be characterised as a "feasibility sample". Their participation was highly voluntary and they were eager to participate. The main criterion for selecting participants was that they had taken the pedagogical theory courses in previous semesters. The size of the participants was not particularly large, because, as Isari and Pourkos (2015) mention, qualitative research does not follow precise rules and strict limitations in terms of sample size. Thus, the number of 12 participants in our sample was considered satisfactory, as the research aimed to highlight subjective and personal views that could be understood in depth (Mantzoukas, 2007).

Validity and reliability

To ensure the validity of the survey, a pilot interview was first conducted with two groups of students who would not participate in the survey to see if all the questions were understood. After ensuring the clarity of the questions, individual interviews were conducted.

To be reliable, transcribed interviews were given to five participants from our sample to confirm their responses. In other words, what Creswell (2016) defines as "member checking" was applied considering it necessary to the accuracy of the data.

Data analysis

For the analysis of the results, we followed the thematic analysis proposed by Tsiolis (2014), so that the researcher is guided through the coding process to assign the themes according to the research questions. Initially, the interviews were transcribed with an accurate recording of the words (Tsiolis, 2014). This was followed by analysis with the creation of initial codes. Some codes were combined (codes with similar characteristics or meanings) and formed categories or higher level codes (Tsiolis, 2014) according to Glaser and Strauss' Grounded Theory, (in Tsiolis, 2014). However, the researchers did not aim to derive a new theory, but rather to confirm pre-existing findings or formulate new ones.

4. Survey results

The Usefulness of Theoretical Courses

The coding of the interviews showed that the pedagogy courses generally helped students in implementing their microteaching. Specifically, they were able to concretize the respective concepts

of Teaching Methodology and Educational Assessment (course concepts, objectives, objectives, methods, teaching techniques, teaching tools, etc.) and use them didactically. They also found the concept maps taught in the Teaching Methodology lesson very useful, they made them understand how to summarise the lesson in class and how to arrive at the main concepts of their teaching. As the student (4) argues:

"These lessons helped me in terms of bringing out my thinking and vocabulary.... In the PET (Practical Exercises of Teaching) that we do now and later on in school, we have to have some concepts in our minds, such as methods, means, techniques...we were able to separate these in our minds. We didn't know these things, and we were taught them in specific courses. That's what they helped me with: being able to separate them and being able to use them at any time, either now or in the future if I get involved (in education), to make the course more interesting and less ineffective..."

In addition, it was considered that the examples given to the students during the Teaching Methodology, the explanation of each teaching method and the guidance for completing the lesson plan that they carry out in each microteaching session were particularly useful for the implementation of the microteaching. According to Student (1):

"The truth is that both courses (Teaching Methodology and Educational Evaluation) were quite helpful, because the teachers showed us during the lesson how to use each teaching method and so on, so now that it was time for me to use it, it seemed easier than if I had no contact". Similarly, Student (5) stresses:

"Definitely the Teaching Methodology course helped me the most of all and the reason is that we had seen the phases for each of the different ways of teaching separately..."

And Student (2) adds: *"Yes, the pedagogical courses helped me quite a lot, but I mostly apply something simple to my own teaching...."*

Furthermore, those who had attended the pedagogical courses felt more prepared to put into practice the various teaching methods, such as concept elaboration, group collaboration and exploration. Although most of them stressed that they had not fully assimilated each method, they argued that putting them into practice increased their level of understanding of the teaching methods. In general, however, they admit that they have received a satisfactory understanding of these methods from the delivery of the respective courses:

Student (1): *"I believe that I have understood them sufficiently and that I can apply them in the classroom."*

Student (3): *"It helped me because we had the slides explaining them...but there I was a little confused about what each one was.....but okay...it helped me overall with the lesson..."*

Student (4): *"Yes, ...it is very different to have a definition in your mind, like working out concepts, and very different to have to organise a whole teaching on that, even if it is 15minutes ..."*

Also, some participants said that they have only got a general idea from the theoretical courses, and they did not feel fully confident to implement all these. On the other hand, they said that the past time between the theoretical courses taught and the micro-teaching sessions made it difficult for them:

"To a certain extent I can say that I have understood some things. But it's generally what I remember. it's been a long time... Also, the classes were in quarantine so we were not able to ask questions... to talk to the teacher in the context of the way the class was conducted..." (Student 9)

Similarly, Student (3) argues: *"... I would like them to be in a bit longer year...because - let's say we did them in 2nd and 3rd and here we came to do the PET (Practice Exercises of Teaching) and we're in 5th year...- ... and I had to go and see them...revisit them...because so many lessons have passed since then..."*.

Regarding the relationship between theory and practice, participants said that theory is generally useful for applying knowledge, but there should be no distance between the two. Most students argued that theoretical knowledge is far from application. In fact, they are asked to take into account many factors, and unforeseen situations that will arise and they have to manage them, such as the needs of their future students. In general, they felt insecure when they finally had to apply in their teaching what they learned in theory.

"...it's a lot of work behind the scenes until you get into the classroom...but I hadn't experienced it, to actually understand how difficult it is, and when I actually did....or was....it was actually very demanding, very demanding." (Student 1).

"It's too far! Because in theory we have a certain pattern of student in mind. Whereas in practice, we talk about different students who may not be able to fit into it..." (Student 6).

Student proposals

Regarding what the students suggested as the most useful and helpful means, were the discussions during the lessons, the teamwork and cooperation, and the material posted by the teacher were highlighted. In particular, they felt that the interactive lesson in relation to the teacher's teaching material enhanced the organization and preparation of the Teaching Practices, while the appropriate material was a guide for them to apply some elements of theory in their Microteaching.

As the students argue: *"I would say first of all the teacher because the more e.g. he gives you the material and applies it already, the more he helps you to consolidate it better...This, but also with notes and the forms that were given to us at the beginning of the PET that is and there I keep referring especially to the form for the steps of each teaching..."*. Student (7): *"I was helped by the discussions and examples within the lesson and the material that was uploaded...not the book..."* (Student 3).

Also, almost all respondents said that they would have liked, before implementing their microteaching, to have seen more "Practice. Another suggestion was for some groups of students to make small presentations of teaching or lesson plans, so that all students could better consolidate the process and apply the teaching methods more comfortably later in their Microteaching. Others said that examples of microteaching from other students or lecturers would be very useful, and some suggested some seminars to present the methods. However, all these should be timed closer to their micro-teaching courses. Some more views:

"I think that in the theoretical courses there could be something like short sketches (meaning something like simulated microteaching). Now we faced something new (in the PET). If we had done it even for five minutes in class, with improvisation completely, it would have helped us more....we would have been less stressed because we would have had a picture in our minds the first time of what we had to do..." (Student 4).

"Yes...if we could see it...I mean, if we could see the PET of other kids practicing on it, so we could see it for next year." (Student 6).

"It could be more interactive and with more practical applications. Because we're tertiary, what was done now in the microteaching could have been done earlier, in the first courses, so that we could make it more our own, get closer to it." (Student 8).

So it was clear that for students is very useful, more practice, examples and interaction for becoming more effectively consolidate the theory they are learning.

Finally, they argued that the teacher needs to make the lesson engaging and inspiring for their students. The combination of all the above skills the students admitted that it was very challenging. Let us look at some of the students' views:

"... there must be liveliness in the classroom...doing different things so that you can attract interest and there is always excitement about what they will learn in the future...." (Student 5).

"It is a demanding process to teach. You have to master the course first of all, be able to have fluency in the classroom, constant interaction with the children so they don't lose interest, lots of material and up-to-date material: videos, power points...and definitely don't just stand on one source...I find the textbook very outdated now...so lots of preparation!" (Student 7).

Finally, several students, except of the courses of Teaching Methodology and Educational Evaluation, found also useful Psychology or Educational Technology because made them interpret more correctly adolescent behaviors. Similarly, Educational Technology and New Technologies in education, allow more interactive lessons, and they were also taught lesson plans, which were useful for the organization and implementation of their Microteaching.

5. Discussion and Conclusions

The above analysis shows that students consider that they benefited to a fairly satisfactory extent from attending theoretical courses related to their microteaching. Something similar was also shown by research by Aslihan and Naci (2013), according to which the microteaching method gives teacher candidates the opportunity to evaluate what they gained from teaching the theory they were taught and whether they were able to put into practice what they learned theoretically (Aslihan, Naci 2013). This view was evident in the current study, in which participants claimed that the theory helped them to put some elements into practice and that they would have found it more difficult if they had not known them. Other research with similar results was by McDaniel et al, (2021) whereby students suggested that demonstrations/examples of application of theory were done to make it understandable, while applying their own theory designs would lead to consolidation of knowledge (McDaniel et al., 2021).

Also, the need and benefits of group discussions and collaboration among students which were Emphasised through suggestions by the students in this study are also confirmed by Johnson and Johnson's (2015) study which found that collaborative lesson development and group collaborative methods that a teacher can incorporate promote social skills and improve the effectiveness of students' efforts when transforming theory into practice (Johnson, Johnson 2015).

However, almost all participants stressed that while they were helped to some extent by theory, there is a difference between theory and practice and many teaching issues had not been imagined. In fact, according to their microteaching, they were more concerned with practical issues and less with the theory they had been taught. This is also highlighted by their research (Crichton, et, all, 2021), where few made connections between theories of learning and microteachings, but also stressed that they were greatly helped by the practical experience they gained. This point has been confirmed in our research. We also found that through micro-teaching, beyond some difficulties they faced, they became conscious of what they had been taught and felt readier to teach. This is also agreed by their research (Crichton, et, all, 2021) where the participants gained more confidence and engaged in the pedagogical approaches they had been taught in the theory courses (Crichton, et, all, 2021).

Another important point to highlight is the request of many of the participants for being 'exposed' to more practical teaching exercises and teaching models others profession or older students, in order to link theory and practice more effectively. Additionally, there was as suggestion, the theory courses should be taught in semesters closer to micro-teaching implementation, for not be a long-time gap between theory and practice.

Finally, students stressed that teaching is a particularly demanding process that needs many masters to be effective. Thus, the students in the application of Microteaching have been able to meet the fact that the teaching profession is particularly demanding and difficult, as was evident in the research of the (Karlström, and Hamza, 2019). In that participants, after their microteaching, realised the importance and difficulty of the teaching work (Karlström, and Hamza, 2019).

Research limitations and suggestions for further research

This research is important for teacher education, because we seek to effectively link the theory and practice of teaching. For this purpose, the students' views as future teachers were used. However, certain restrictions should also be mentioned. Particularly, the study involved students who were taught the theory of their pedagogical courses remotely due to the recent pandemic. This event could affect the results of this study and different conclusions could be drawn if these courses had been taught face-to-face.

In addition, there was as a sample a limited number of students as is customary in qualitative research with research tool interviews. So, we cannot be sure about generalizing the results. If the data were quantitative, we would have a much larger sample of students.

Finally, the time gap between the teaching of the courses concerned by the research and the application of Microteaching could also affect the results. It would therefore be useful this parameter to be considered by the curricula of all university departments of education.

In conclusion, we find that questions are raised about the purpose of teaching theory at the university, as this research has shown, which investigated the connection between theory and practice of microteaching. Can we then ask ourselves whether the teaching of theory should aim at the readiness of students to put into practice what they were taught and whether the lessons should be made more experiential?

This research tried to raise these concerns, but future research could focus on the relationship between other courses and teaching practices within teacher education or university pedagogy and explore how much the above can ultimately be applied to a real class.

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17. Student-centred education as presupposition to child-centered education: A case study of trainee pre-school teachers at the university of Crete

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Abstract. According to child-centred education, children learn better via action, play, and when their needs and interests are addressed. If child-centered education is sought, trainee teachers should have firsthand experience with such a model during their studies. This a qualitative research that aims at: a) investigating students' perceptions towards child and student-centred education and b) engaging students in actively developing their own teaching in

kindergartens through the module of teaching practice at schools. The data were collected through: a) students' questionnaires and final reports, and b) the researcher's observations of how students collaborated with their tutor. Using the method of content analysis, the findings shed light on: a) trainee teachers' perceptions regarding what is a child and a kindergarten teacher, b) the areas the students mainly wanted to acquire expertise, c) how students and tutor collaborated to design the content of the laboratory lessons, and d) students' reflections upon their lesson experience.

Keywords. *Student-centred education, child-centered education, preschool teachers, kindergarten*

1. Introduction

According to child-centered education, children learn better through action, play, and when their needs and interests are addressed (Essa 1999; Chung and Walsh 2000; Tzuo et al. 2011). If child-centered education is sought, trainee kindergarten teachers must have firsthand experience with such a model during their studies. However, have students experienced how it is to learn through action and play? How can trainee teachers appreciate and put into practice child-centered education if they themselves have probably not experienced what it is like to receive an education that is student-centred?

Student-centred education is based on principles that encourage students to: a) be actively included in their learning process; b) reflect upon their learning and the assessment methods used; c) cooperate and co-design with their tutor their own learning outcomes; d) become more autonomous in taking responsibilities and intrinsically motivated to learn and apply what they have learned; e) respect and incorporate students' experiences in shaping their learning; and f) develop students' higher-order thinking (e.g. reflection, metacognition) (McDonough, 2012).

The main hypothesis of this research is that if trainee teachers experience what student-centred education could offer them, then they might apply their experience to their teaching and transform it into a more child-centered experience for the children. The particular goals of this research are to investigate: a) students' perceptions regarding what is a child and what is to be a kindergarten teacher, b) students' needs and interests concerning the particular module and c) ways of students-tutor's cooperation towards a more student-centred education.

2. Methodology

This is a qualitative research concerning 48 trainee teachers who studied at the department of preschool education of the University of Crete and attended the second level of their practice at schools during the academic year 2022-2023. Level 2 students begin their teaching experience at kindergartens and teach for half a day three times in the fall semester and one whole day and a half for the spring semester (Department of Preschool Education_Undergraduate studies regulation,2022).

The researcher is one of the students' tutor for their practice at schools who has previously worked as a kindergarten teacher and a philosophy for children practitioner. At the beginning of the fall semester, students were introduced in Lipman's idea of community of inquiry rooted in Dewey's and Pierce's pragmatism, according to which the teacher is a co-researcher, and both children and teacher are equal in inquiring about a particular subject, trying to articulate arguments, support their opinions, listen carefully to each other, and build on each other's ideas (Lipman, 2003; Splitter and Sharp, 1995). Within a community of inquiry, the teacher acts mostly as a facilitator in the classroom who provides children with lots of stimuli, reassures a safe environment for children to flourish (Haynes, 2008), listens carefully to children's ideas and allows their ideas to be heard and expressed through speaking, acting, moving, and through arts (Nikolidaki, 2018).

The methods used for data collection were the participatory observation of the students during the laboratory lessons and taking notes by the researcher, the open questionnaires filled out by the

students, and the students' final reports (Merriam and Tisdell 2016; Moss 2019). Regarding the methodological framework, it passed through three phases:

1. Students at the very beginning of the semester were invigorated to present themselves—who they are, what they like, and why they chose (or did not choose) to become students at this department. Then they were encouraged to fill out an informal open questionnaire in which they were asked to define:
 - what it means to be a child,
 - what it means to be a teacher,
 - whether they would like to become teachers and
 - what they would like to learn regarding their practice in kindergartens.

Students were informed that the completion of the questionnaire was not obligatory, but it would help their tutor get an idea of who they are and what they expect from the module. The researcher also mentioned that she would examine their answers thoroughly so that she could meet their needs and interests regarding the module to the maximum degree. She made it clear that she wanted to read what the students truly believed and not what the tutor would like to hear.

Using the content analysis, students' answers were categorised, and the results were shown to the students in the second laboratory exercise. The students and the instructor had the opportunity to discuss and find misconceptions or hidden presuppositions regarding what it means to be a child or a teacher, what is or should be the role of the teacher, and how the students' needs and interests concerning their practice at kindergartens would be met through the laboratory lessons. There was also an effort to embed students' experiences and expectations in shaping the module so that it would be more appealing to them.

2. The tutor and the students acted as co-designers of the module throughout the academic year. Particularly, students and tutor agreed upon the content and structure of the laboratory lessons, the students' and tutor's responsibilities, and the students' ways of assessment and evaluation.
3. At the end of the academic semester, students had to reflect and complete their reports distributed by the Quality Assurance Unit of the University (MODIP) explaining whether their expectations were met, suggesting ways to improve the learning outcomes of student practice, and evaluating both their contributions to the classroom and their tutor's efforts to incorporate student needs and interests into laboratory instruction.

Using the method of content analysis (Merriam and Tisdell 2016; Cohen et al. 2008), the findings show: a) in which areas the students mainly wanted to acquire expertise; b) how students and tutor collaborated to design the content of the laboratory lessons; and c) students' reflections upon their lesson experience.

3. Results

3.1 How do students perceive 'What is a child'?

The list below presents parts of students' quotes out of the 45 responses in total regarding their perception of children (Figure 1). Using the content analysis method and categorising students' answers, the findings are shown in Table 1.

Students' perceptions regarding what is a child

1. *A child is to explore, to want to learn, to discover, and to play in a safe environment established by the family and school.*
2. *A Child is to be spontaneous, to love, to play, to be full of energy and life, to be happy, and to be curious to learn about the world.*
3. *Child means purity, tenderness, carefreeness, freedom, happiness, fun, laughter, and play.*
4. *Child means to live in a world of discovery and exploration away from the philosophy of being in a hurry to grow up.*
5. *Children are the future, and we as adults have to establish relationships based on trust and respect.*
6. *Children are meant to explore the world, to make mistakes, and to be a bit of a pain in the neck for the grown-ups because they live without complex syndromes or social taboos.*
7. *To be a child is to be enormously creative and live in the world of fantasy.*
8. *If I don't understand children's world, their needs and interests, and their psychology, I will not be able to*
9. *Children have their own needs and interests. If something is not interesting, then it is meaningless for the children. Children need to be surrounded by stimuli.*
10. *Children are open-minded, sensitive, and willing to discover everything.*

Figure 1. Student responses to the question “What is a child?”

Table 1 Categories of students' answers

Concept	Question	Initiated by
Children's Purity	What does it mean to be pure? How purity is shown in children? Is it a positive trait? Why?	Tutor
Fantasy	What is the world of fantasy? Do children live in fantasy? How do you maintain balance between fantasy and reality? How children's fantasy affects practically your teaching?	Students
Taboo	Do children live with no taboo? What is considered as taboo?	Students
Stimuli	What kind of stimuli do children need to develop?	Students
Growing up	What does it mean not to be in a hurry to grow up? How can children remain children and live their childhood?	Tutor/ Students
Limits/ Restriction	Do children need limits? What kind of limits? How do you reassure that adults rules do not block children's creativity	Students
Applying student's perceptions for children into their teaching practice	How does your perception regarding what is a child affect your teaching? How can you make your lessons plans line up with children's needs and interests?	Tutor

Most students attributed positive attributes to children, highlighting children's: a) personal traits and characteristics, b) activities, and c) needs and interests that have to be covered by the adults. Students perceived children as pure, innocent, happy, and creative creatures who play, explore, discover, and learn the world among them. Student answers were further questioned, discussed and explored within a community of inquiry seeking a better understanding of the traits the students attributed to the children.

Table 2 summarises some of the questions that students or the tutor questioned furthered based on students' answers concerning what is a child.

Table 2. *Concepts and questions discussed in laboratory lessons*

Students' needs	Frequency	Percentage %
How to love children?	5	11,11111111
How to teach children properly	7	15,55555556
I expect our tutor to treat as like children and do not take for granted that we know everything she mentions to us.	1	2,22222222
How to deal with difficult situations in the classroom	18	40
Acquire more knowledge	20	44,44444444
How to deepen on children's world	3	6,66666667
How we can learn more out of children	3	6,66666667
Get more teaching ideas	15	33,33333333
How to become a kindergarten teacher with not so much effort.	1	2,22222222
What phrases I should use so that I will not heart any child or make any kind of discriminations.	1	2,22222222
Alternative ways of teaching	18	40
What I should do in the classroom.	8	17,77777778
How to deal with children that have learning dissabilities	13	28,88888889
Acquire more experience	25	55,55555556
Acquire more teaching techniques	25	55,55555556
Learn more about theatrical play and how to use puppets	5	11,11111111
How to confront quarrels among children	15	33,33333333
How to collaborate with the parents	4	8,88888889
How to avoid making mistakes	2	4,44444444

Students analyzed "what it means to be a child" and "what children's needs are" based not only on the literature review but also their personal experiences. Then they developed their teaching according to the traits they attributed to the children following inclusive strategies into their teaching. For instance, if children are perceived as curious, creative, and full of energy, then students have to "embed" these traits into their teaching. Therefore, students, with the tutor's assistance, have to find out how their teaching will trigger children's curiosity and creativity. If

students agree that children's questions should not be left aside, then they have to find practical ways of incorporating children's questions into their teaching and co-designing activities with children.

How students perceive the role of the kindergarten teacher

Students' perceptions regarding what is a kindergarten teacher

The kindergarten teacher...

1. *...helps and teaches children how to discover themselves and how to develop their character further.*
2. *...is a job that one has to have passion for and love for the children.*
3. *...is a second mother for the children. He or she is the children's second home.*
4. *...is a friend; she should not have a stereotyped relationship with the children.*
5. *...is the one who helps children acquire more knowledge through experience and play.*
6. *...is the one who has to gain children's interest and respect. He or she has to be constantly occupied with the children.*
7. *...transmits new knowledge to the children and creates a safe environment so children's fantasies can flourish.*
8. *...is not an easy job, as many people believe. In order to become a kindergarten teacher, you need to have broad knowledge, lots of fantasy and creative thinking, and be thirsty to work hard and create many*
9. *...is a source for children's inspiration.*
10. *...is a professional who, through a series of planned actions, enables children aged 4-6 to develop many educational, social, and sentimental goals. The kindergarten teacher needs to have a high sense of responsibility, be constantly in a working mood, be creative, and be able to listen and observe children.*
11. *...is a role model for the children.*
12. *...is the one who has to love the children and be very patient.*
13. *...is not only for transmitting knowledge and providing children with information.*
14. *...is responsible for triggering and developing intelligent children able to think critically and creatively.*
15. *...has a crucial role in children's development as the child is at a very pivotal age. It is usually the first time children step out of their house.*
16. *...is simultaneously a teacher, an artist, a psychologist, a musician, a manager, a cleaner, and many other jobs that now do not come to mind.*
17. *...is a caring person who needs to gain children's and their parents' respect.*
18. *...has to be a child himself or herself with the children.*

Figure 2. *Student verbatim responses to the question 'What is a Kindergarten teacher?'*

Figure 2 summarises some of the students' answers that generated further questions to discuss.

Students' answers provide food for thought as they reveal hidden presuppositions and misconceptions regarding the role of the kindergarten teacher. According to the students' answers, the relationship that the teachers have to establish with children varies within a spectrum of teachers being professional towards children (sentence 10) or role models (sentence 11), being children's friends (sentence 4), being like a second parent (sentence 3), and being like children themselves (sentence 18). These different attitudes had to be discussed within a community of inquiry, and in the meantime, students realised how their perceptions of what the teacher's role is can affect the way they approach and teach children.

The transmission of knowledge to the children seems to be important for the students, even though their responses did not state clearly what knowledge kindergarten teachers need to have and what knowledge they transfer to the children. Furthermore, it seems that the idea of teachers and children constructing knowledge together and learning from each other was not that popular among this particular group of students. Sentences such as 7, 8, 9, 10, 15, and 16 assign the teacher a more prominent role in the classroom.

Categorising student answers further, it seems that they conceptualise the role of a kindergarten teacher as a complex one that requires certain: a) personal-character traits that sketch the kindergarten's teacher portrait; b) skills (communicative skills with both children and parents, management skills, etc.) and dispositions that the kindergarten teacher needs to develop; and c) knowledge that kindergarten teachers need to acquire.

3.2 What are the areas the students need more expertise?

The most common students' responses are shown on table 3

Table 3. *Children traits, activities and needs*

Children's traits	Children's activities	Children's needs
Playful	Play	To understand children's world
Creative	Explore	Live with no complex/ taboos
Pure	Discover	Love (Offer/ Need)
Innocent	Make mistakes	To understand children's psychology
Tender	Learn	Not being in a hurry to grow up
Spontaneous	Laugh	Safe environment
Happy	Make noise	Stimuli
Curious		Freedom
Carefree		Restrictions, Rules, Limits
Messy		
Impatient		

Students responses revealed that acquiring more knowledge, experience, teaching techniques, and becoming familiar with "alternative" ways of teaching are what they need most in order to become kindergarten teachers. The students focused more on how to resolve practical issues that prevent children's learning processes (e.g., quarrels among children) than on acquiring a broader understanding of children's ways of thinking or how students as trainee teachers can learn more from children and improve their teaching.

Students responses, though, had to be further clarified for both themselves and the tutor. The table 4 summarises some of the questions that have arisen and been discussed within the tutor's and students' community of inquiry. For instance, when some students asked how they could love children, we discussed how love is or should be expressed in the classroom, providing arguments. Loving children means not only showing tenderness but also being responsible towards them, providing them with stimuli that awaken their creativity, setting rules for their safety, and being occasionally persistent when necessary (defining further what this means!)

Table 4. *Questions discussed in laboratory lessons*

Question	Initiated by
Is making mistakes a bad thing?	Tutor
What does teaching properly mean?	Tutor
Is there a proper way to teach?	
What do we mean by getting more knowledge? What kind of knowledge?	Students
Are there certain tips/ techniques that can stop children from quarreling with each other?	Students
What do you mean by alternative ways of teaching?	Tutor/ Students
What is considered as ordinary/ alternative teaching?	
What does loving a child mean?	Tutor

3.3 How students' needs were (or were not) taken into consideration

After the initial discussions regarding the questionnaire, the tutor explained what the goals of the teaching practice in schools and the laboratory lessons were and the procedures that had to be followed according to the department's study guide. However, there was room for further re-designing the module so that it also meets the students' needs and interests (Nieminen, 2022). The students and the tutor co-designed and agreed to the followings:

- *Dates and teaching subjects:* Students and tutor agreed at the beginning of the semester on the particular dates and subjects they would teach at the kindergartens, so they had plenty of time to get prepared. Extra individual or group support for the students was also provided, if needed, through appointments at the tutor's office.
- *The structure of the laboratory lessons:* Students and tutor both agreed that there would be time for students' devoted on: a) students' preparation on each teaching subject, b) students' sharing their teaching experience, discussing difficulties in schools, how they resolved them and alternative ways of better resolving them (Lipman, 2003), c) elaboration, reflection and giving feedback regarding students' teaching experience at kindergartens (Collins and Brown, 1988), d) presentation of real problem solving teaching situations in kindergartens in which students worked in small groups, tried to understand the aspects of each problem and provide solutions by applying certain methods and techniques and linking theory with teaching practice at kindergartens (Johnson et al., 2014; Walker and Leary, 2009), and e) further questions, chatting and role-play games when applicable (Mumtaz and Latif, 2017).

- *Extra special workshops*: There would be some special workshops within the laboratory lessons on areas of expertise in which students show interest, such as theatrical play, the use of puppets in the classroom, the importance of questioning, how to deal with parents, and how to deal with difficulties that arise in a kindergarten classroom. The tutor covered some of these areas based on the literature review and her own previous experience. She also invited experts in the area of theatrical play and philosophical inquiry who were willing to contribute and allow a more interdisciplinary learning approach to take place (Ashby and Exter, 2019; Tarrant and Thiele, 2017). The department was informed and consented.
- *Students' formative assessment*: Students agreed that their first submitted lesson-plans would be fully checked by their tutor individually. The tutor would give constructive feedback before the students taught in the classroom. According to this initial feedback, students would work for the rest of their assignments. Students' assessment was based on their performance at schools and laboratory lessons, their self-assessment and their peer-assessment (Tai, 2022). Students had the choice either to submit parts of their assignment upon completion of their teaching at school, or submit their final assignments at the end of the semester using the e-class platform.
- *Students' responsibilities*: The students had to prepare and send their lesson plans to their tutor on time; otherwise, they would not be able to get feedback on time. They had to pay close attention to the initial feedback concerning their lesson-plans, as they had agreed that they had to become gradually more independent in designing their own activities. Students also agreed that they take responsibility for their teaching, bearing in mind the tutor's feedback and helpful comments from their peers in the laboratory lessons or the kindergarten teachers at schools. The tutor was available to discuss any students' further queries.

3.4 What are the students' reflections, and how is student-centred education linked to child-centered education?

Judging by the MODIP assessment results of the University of Crete for the particular module (Questionnaire no. 653599 Students' teaching practice at school Level 2), students were highly satisfied regarding: a) their preparation before teaching, b) the feedback after their teaching, c) the students-tutor collaboration, d) the goals set, e) the knowledge acquired by the module.

Analysing students' reports, there were a few elements that were repeated in their comments, such as:

Traits and qualities of the tutor: Authentic, kind, supportive, humorous, creative, respectful, playful, demanding, and strict when needed.

Student-tutor collaboration: listening to the others and bearing students' opinions in mind; being available when students needed her; being analytical during the laboratory lessons; being reflective; and sharing her previous experience as a kindergarten teacher

Negative points: Students needed more time to submit their lesson plans, which was not always given due to limited time for the tutor to make corrections; Sometimes students needed more time to

analyze certain activities in the laboratory lessons; Some students preferred to have private feedback instead of discussion in plenary their teaching.

4. Discussion and Conclusions

Was students' practice at kindergartens and their laboratory lessons at the university an opportunity for a more student-centred education? According to the findings, the answer is positive. The initial questionnaire was helpful in multiple ways, and its approach was highly connected with student-centred education because it: a) functioned as an icebreaker and a way to get to know each other better (Haynes, 2008); b) enabled students to delve into their answers, identify the hidden presuppositions, and fix possible misconceptions regarding the role of the teacher and what is considered to be a child (Lipman, 2003); and c) was a tool of commitment for students to work hard and meaningfully towards the criteria they had themselves set and abided by (Lipman, 2003).

As far as students' needs and interests are concerned, and bearing in mind the students' reports, they admitted that their opinions mattered and were carefully taken into consideration by their tutor (McDonough, 2012). Students had the opportunity to practice problem solving and inquiry-based learning and teaching, which helped them listen carefully to each other, discuss, find arguments and counterarguments to defend themselves, and learn from each other's views (Brew, 2012; Justice et al., 2009; Lee et al., 2004; Lipman, 2003). Students found the laboratory lessons meaningful as there was a clear link between theory and their practice at school, and they also felt intrinsically motivated to commit to their teaching and set even higher expectations than their tutor would. If, for instance, students perceived that children and teachers should collaborate with each other, then they had to incorporate or start with children's ideas when designing their lesson plans. Students also felt safe knowing that they could get guidance from their tutor when needed. Students, finally, were happy to have a choice in their assessment; however, most of them submitted a final assignment at the end of the semester. This finding shows that either students prefer traditional but more familiar to them ways of assessment or that they struggle to split their job into small parts and commit to work methodically throughout semester. It seems that students need more time to experience student-centred approaches.

Students' reports regarding students' cooperation with the tutor highlighted the importance of authenticity. Some students asserted that student-centred approaches work only if the tutor has some special traits (e.g., is highly knowledgeable and experienced, has a good sense of humour, and truly cares for enabling students to learn) instead of using them 'for the sake of' impressing the students. Students often felt like equal members of a community of inquiry and had very profound, almost philosophical, discussions concerning the teachers' role and what is considered to be a child, how it should be treated, etc. The tutor was facilitating the students' dialogues. After analysing students' responses, many questions were raised and further discussed, which helped students acquire a deeper understanding of their role as kindergarten teachers. The community of inquiry was a meaningful process, fully experienced by the students, and potentially the first step for the students to try it with the children in the kindergarten (Lipman, 2003).

Regarding the question of whether students transferred their student-centred teaching into their own teaching, converting it into a more child-centered approach, students felt that their teaching was student-centred, but they did not always transfer this experience into their teaching with the children. Students might have needed more time to: a) experience and digest what student-centred

education is throughout more university lessons; b) reflect on their student-centred experience and incorporate it into their own teaching; c) understand that their conceptions or misconceptions shape their teaching. Students felt satisfied when the tutor took their ideas into consideration and let them co-design the structure and content of the laboratory lessons. This experience made them think about how they could cooperate with the children and take into consideration their questions and ideas. Finally, the students mentioned that student-centred teaching made them more intrinsically motivated and responsible towards their teaching and helped them get a better understanding of what child-centered education is.

In terms of limitations in this study, the use of the questionnaire was artificial and forced students to answer within a limited time frame questions that had a more philosophical character and were potentially not that relevant to the students teaching. Students might have completed the questionnaire out of duty because "they had to" or because everyone else did so. They might also not have considered that their answers would be scrutinised, so they might have given vague or rough answers, which can be considered a limitation of the research. However, the discussions concerning the questionnaire within an inquiry with the students made them clarify their own thoughts and link practically and constructively philosophical matters with their particular teaching in schools, which are signs of higher-order thinking (Freeman et al., 2014). Students realised that not only had their tutor studied their responses, but she had also categorised their answers and was there to discuss their ideas with them. This activity, however, could have been done with the students, but due to limited time, the tutor explained how she had worked and categorised the students' answers. Many students confirmed the discussion of the questionnaire as a sign of a student-centred education with a positive impact on them.

Regarding difficulties for both students and tutor, students always wanted more time to work on their lesson plans. Time was limited for both students and the tutor (White et al., 2016). However, through discussion, there was always a mutual consensus that the students would complete their tasks on time so that the tutor could give feedback and discuss improvements for their lesson plans.

As for the tutor, her job was very demanding since in a very limited time she had to: a) work hard on students lesson plans and provide feedback in a very limited time; b) regularly observe and take notes during students' teaching at schools; c) find the balance between making corrections and being respectful and constructive towards the students; d) make good use of time during the laboratory lessons so the students could benefit from learning more about teaching methods and techniques; e) always find time for students to share their experience, reflect, collaborate, and learn from each other. On top of this, the tutor's didactic effort in applying a more student-centred approach is not celebrated or taken into consideration for her further academic progress as the criteria depend only on her published research (Light and Calkins, 2008). It seems that a student-centred education gives the tutor ethical satisfaction that at least some students appreciate the benefits they get, as they feel that "our needs and interests are heard", "our opinion matters" and "we feel that someone helps us show our better teaching self".

By and large, more research should be done regarding how student-centred education can be applied in more academic modules and connected more to child-centered education. There is also a need for developing academic short courses that provide guidance and assistance for both students and tutors regarding student-centred education. Finally, tutors' teaching should be more valued and count more on their professional academic development and progress.

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18. Science students' beliefs and expectations towards informal learning environments: a case study

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Abstract. Informal learning has fewer evidence-based applications in Higher compared to Primary and Secondary Education. The aim of this preliminary study was to investigate the beliefs and benefits of Sciences' students regarding informal learning environments.

The study was implemented within the Teaching Certificate of the School of Science and Engineering,

of the University of Crete (UoC) together with the Natural History Museum of Crete-UoC (NHMC-UoC). An experiential workshop was conducted by the NHMC-UoC on Earthquakes, Volcanoes, Prevention and Interventions, following the Inquiry Based Learning methodology. Twenty three (n=23) students participated in the study, from the Departments of Mathematics and Applied Mathematics, Biology and Physics. Quantitative data were collected through 27 questions, using a 5-point Likert Scale divided into 3 sections: before, during and after the workshop; qualitative data came of 7 open ended questions. Students answered both as students and as future secondary school teachers. The mean satisfaction score was very high (4.64). More than 80% of them considered the visit to the NHMC-UoC very important for their personal learning, and claimed that it helped them better understand the topic. They believed that the in-class preparation before and having students' feedback after the workshop as important, They also considered necessary to be trained on informal learning environments and 90% will incorporate informal learning activities in their future teaching career. Student feedback was also derived from the open-ended questions regarding the benefits of the informal learning environment and their proposals for more hands-on experience on it. This study confirmed the positive impact of incorporating informal learning environments in higher education.

Keywords. *Informal learning environments, Science Education, Secondary Education, Natural History Museum*

1. INTRODUCTION

Informal learning takes place outside of formal settings, i.e. schools and colleges, and arises from the learner's involvement in activities, through experiential learning, that are not undertaken with a learning purpose. Callanan et al, (2011) claimed that there are five dimensions of informal learning: non-didactic, socially collaborative, embedded in meaningful activity, initiated by learner's interest or choice, and removed from external assessment. Informal learning has been successfully applied and validated in primary and secondary education (Rennie., 2007; Vela et al., 2020). Museums often design exhibitions to provide experiences and meet educational goals, especially with respect to school-aged children who visit either with families or in school groups (Cox-Petersen..et al.,2003;Mortensen and Smart,2007; DeWitt and Storksdieck, 2008; Crowley et al.,2014). However, there is currently a lack of quantitative empirical studies to support this assumption for higher education (Decius et al., 2022).

The aim of this preliminary study was to explore Sciences' undergraduate students' beliefs and expectations towards informal learning environments, and particularly a Natural Science's Museum. In addition students' beliefs and expectations as future Sciences' teachers were investigated.

2. METHODOLOGY

A two-hour experiential workshop embedded in Teaching Certificate's module of Educational Psychology for UoC Sciences' students, was carried out by the Natural History Museum of Crete.

Study population: 23 students participated to the study (20 female, 3 male) from the Departments of Mathematics and Applied Mathematics (n= 12), Biology (n=6) and Physics (n= 5).

Informal Learning Teaching Intervention: Before the intervention in the NHMC, pre-visit preparation work in the classroom on the topic "Earthquakes, Volcanoes, Prevention and Interventions" was organized and presented by a group of students. Online material and mobile devices, as learning tools, were used for students' interaction and familiarization with the topic (Pierroux., Krange and Sem, 2011). During the two-hour workshop, students formed a circle with all participants facing inwards and played a popular game called "Broken Telephone" (Chinese whispers) used as an ice-breaker prior to a brief introduction to our subject. In this game, a phrase is being whispered from person to person, and the original and final phrases are being compared. The phrase we use is "Natural events". A brainstorming activity followed as a further introduction to the subject (earthquakes and tsunamis). Terms placed for discussion were "Natural events", "Earthquakes", and "Tsunamis". Various questions were used, such as: What is a natural event? What kind of natural events do you know? Are all natural events harmful to humans? Have you ever experienced an earthquake? Are earthquakes important to our planet and life on Earth? Through this discussion, students realised that all natural events, even earthquakes are parts of crucial mechanisms for the evolution of life as we know it on Earth. After that, the group split into smaller teams (2-5 members). Students had an opportunity to work in smaller parties and enhance their communication and teamwork in problem-solving tasks (McEwan,et al., 2017). Each team received a booklet with quiz questions and performed quick research on the posters and exhibits of the exhibition to discover the answers to these questions. Participants investigated subjects as:

- Methods and technology used to record an earthquake.
- Correlating earthquake events, volcanoes, and tectonic plates on a map.
- Types of earthquakes and types of seismic waves.
- Seismicity of Greece and Europe.

All groups rotated through the exhibits related to these four topics. Inquiry-based learning was used in this activity, targeting the development of knowledge and skills, expertise, self-efficacy, task

commitment, positive attitude towards learning, and increasing intrinsic motivation and creativity (Kori., 2021).

In the second part of the workshop, teams received a box with various items and a backpack. Their task was to fill the backpack with all the items that would be useful in an earthquake event scenario. The group then participated in an informative earthquake simulation programme and received details on earthquake protection measures. Seismic simulation platforms were a valuable tool in boosting students' resilience to natural disasters (Vanciu Rau., et al., 2020). They used the data they obtained to improve their choices for the content of their backpacks. In this activity, students learnt about the precautionary safety measures they could take by making a hypothesis and then checking its validity.

In the third stage of this workshop, each team received a three sections poster before, during, and after an earthquake. They also received several cards containing instructions and actions related to an earthquake event. They should fill their poster by placing the action cards in the appropriate group (before, during, and after). With this activity, students could take the information with them, through a poster they created themselves.

Finally, through a short discussion about the teams' choices for the various activities, the group had a quick recap of the basic terms of the workshop.

Questionnaires

Structured anonymised questionnaires were provided to participant students a) before and b) after the intervention, documenting student's belief regarding the usefulness of visiting a Natural History Museum (as informal learning environment) from two different viewpoints 1) their current status as a Science student 2) their future potential role as Sciences' teacher. The responses were documented on a 5-point Likert Scale (1: strongly disagree, 2:disagree, 3:neutral, 4: agree, 5:strongly agree) , yes/no responses, while full free text responses were also included to document personal and individual beliefs. The questionnaires were anonymised, having a unique numeric identification ID for each student, allowing tracking responses of individual students before and after the visit, and corresponding changes in their responses at individual level.

The question topics included in the questionnaires are briefly presented.

A. Questionnaire Before Visiting NHMC-UOC (QA)

A1. Student Perspective

Importance of museum visit, Importance for selected topic understanding, Reason for visit as a student, Required preparation by teacher, Preparatory activities required, Importance of Museum visit for teaching

A2. Future Teacher Perspective

Reason for visit as a teacher, Required preparation by teacher, Preparatory activities required, Importance of Museum visit for teaching

B. Questionnaire After Visiting NHMC-UOC (QB)

B. Validation. Usefulness of visit, Teaching methodology used, Satisfaction level, Suggestions for workshop's changes

B1. Student Perspective

Importance of museum visit, Importance for selected topic understanding, Reason for visit as a student, Required preparation by teacher, Preparatory activities required, Importance of Museum visit for teaching

B2. Future Teacher Perspective

Reason for visit as a teacher, Required preparation by teacher, Preparatory activities required, Importance of Museum visit for teaching

DATA ANALYSIS

Twenty two valid responses were analyzed. One student's response had to be excluded due to incomplete questionnaire after the workshop had been conducted. The students' responses at each question were encoded as numerical data on XLS documentation sheet, transferred to SPSS for statistic analysis. Responses were summarised as frequencies of individual responses. Differences in pre- and post-teaching intervention (NHMC workshop) responses regarding identical questions were assessed for significant differences with appropriate paired tests, including paired t-test, Chi Square-Fisher exact test or non-parametric. Related Samples Wilcoxon test. The level of agreement of responses before and after the visit was also assessed (paired sample correlation, ordinal by ordinal Somer's d, spearman correlation, kappa value and Pearsons R as appropriate). The level of statistical significance was a p value <0.05 . (Spriestersbach.,et.al.,2009; Du Prel.et al. 2010).

3. RESULTS

A. BEFORE AND AFTER THE WORKSHOP: STUDENTS' PERSPECTIVE.

The following results summarise students' responses on questions before and after the workshop conducted, according to their current status and point of view (Science student). Students responses and corresponding changes in their responses at individual level are presented through the 5-point Likert Scale. The workshop was considered as very important for students' training and personal learning, (mean score >4). There was a non-significant increase in the mean response score after the intervention (from 4.32 to 4.55, before and after, respectively, Wilcoxon test $p=0.197$). In 8 cases (36%) an increase in score was documented (from 3 to 4 or 5 in 4 cases, from 4 to 5 in 4 cases). In 4 cases (18%) a decrease in score was documented (from 5 to 4). In almost half of cases (46%) rating did not change after the intervention. The correlation of responses (before and after) was not significant.

Students considered the workshop conducted as very important for in depth understanding the specific topic, (mean score >4). There was no difference in the response mean score (4.27 before and after the intervention, respectively, non-parametric Wilcoxon test $p=0.963$). In 6 cases (27%) an increase in score was documented (from 2 to 4 in 1 case, from 3 to 4 in 1 case, from 4 to 5 in 4 cases). In 5 cases (22%) a decrease in score was documented (from 3 to 1, from 4 to 3 in a single case, from 5 to 4 or 3 in 3 cases). The majority of cases (51%) did not change rating following the intervention. The correlation of responses (before and after) was borderline significant (Persons' $R=0.431$, $p=0.06$, Kappa $=0.18$)

Regarding the reason of visiting a Natural History Museum, experiential learning was the main reason in students' responses before as well after the workshop (over 50%). Before the intervention, ecological awareness (18%) and link to curriculum and daily life (13-14%) followed as responses. After the intervention, link to daily life (23%) responses increased. The distribution of responses before and after did not differ significantly (Chi-square test Fisher exact test $p=0.06$). In 9 cases (41%) students changed their opinion regarding the reason that they would visit the museum. Reclassification therefore was mainly in favor of daily needs, experiential learning and ecological awareness. In the remaining cases (59%) classification remained the same. The correlation of responses (before and after) was significant, (Persons' $R=0.639$, $p=0.002$, Kappa $=0.371$, $p=0.009$)

Students emphasised the need for in class preparation before visiting an informal learning environment (95% before and 86.5%, after the workshop, respectively). In 2 cases (9%) students changed negatively their opinion regarding the need for in class preparation following the intervention. However, most of the students' responses continue to be the same with 18 students (86.5%) responding positively and a single student (4.5%) responding negatively in both questionnaires. There was not a significant difference in the distribution before and after the visit, Fisher exact test $p=0.136$. The correlation of responses (before and after) was significant (Persons' $R = -0.549$ $p=0.008$, Kappa $=0.224$, $p = 0.01$).

Regarding the type of in class activities needed, most of the respondents emphasised the importance of combining online museum's material and classroom presentation of the topic before (60%) as well as after (72%) the intervention. There was a significant difference in the distribution before and after the intervention (Fisher exact test $p=0.002$). In 5 cases (23%) students changed their opinion regarding in class activities. Reclassification was documented among 3 initial responses of classroom presentation in favor of museum's online material and 2 cases in favor of the combination of online material and classroom preparation of the topic. In the remaining cases (77%) classification was the same. The correlation of responses (before and after) was significant. (Persons' $R = 0.765$, $p=0.001$, Kappa $=0.489$).

B. BEFORE AND AFTER THE WORKSHOP: FUTURE TEACHERS' PERSPECTIVE

The following results summarise responses on questions that students were asked to respond according to their future status and point of view (Sciences's teacher), before and after the workshop conducted.. In general, their responses as future teachers were almost identical with their responses as current students.

The workshop was considered as very important for training and personal learning, also when students respond as future teachers (mean score >4). There was a non-significant increase in the mean response score after the intervention (from 4.59 to 4.64, respectively, Wilcoxon test $p=0.763$). In 6 cases (27%) an increase in score was documented (from 3 to 4 in 4 case, from 4 to 5 in 2 cases). In 5 cases (23%) a decrease in score was documented (from 5 to 4). In half of the cases (50%) rating did not change following the intervention. The correlation of responses (pre-post visit) was low and not significant.

Experiential learning was reported as the main reason for visiting the museum, regarding the teacher's perspective (over 50%). The distribution of responses before and after the intervention did not differ significantly. In 13 cases (59%) respondents changed their opinion regarding the reason that as future teachers would wish to visit a museum. Reclassification therefore was in favor of experiential learning and ecological awareness mainly. In the remaining cases (41%) classification was the same. The correlation of responses (before and after the intervention) was not significant, (Persons' $R = 0.23$, Kappa $=0.13$, $p=>0.3$)

Respondents regarding the teacher's perspective emphasised the need for in class preparation before and for students' feedback after the intervention (95% and 94%, respectively). Regarding the type of in class activities needed, 72% of the respondents emphasised the combination of online museum's material and classroom presentation of the topic before the intervention and 74% of the respondents emphasised the need for students' feedback after the intervention. There was not a significant difference in the distribution before and after the intervention (Chi-square test Fisher

exact test $p=0.407$). Also, the correlation of responses (before and after) was not significant (Pearson $R=0.8$, kappa 0.138 ($p>0.2$)).

Respondents' validation regarding the pedagogical and teaching approach of the museum's educator was also very high. Educator's interaction with the students was validated with a score of 4 (22%) and 5 (78%) and the engagement on experiential activities with a score of 3 (9%), 4 (9%) and 5 (82%) respectively. Inquiry based learning was documented as the main teaching process (74%) followed by team work method (100%), simulation and dialogue (91%) and laboratory demonstration (50%).

C. FUTURE IMPLEMENTATION OF INFORMAL LEARNING ACTIVITIES

Most of the respondents documented the need to be trained on informal learning environments as future Sciences' teachers (70%). Also, more than 90% would incorporate informal learning activities in their future teaching career. The open-ended questions provided their feedback regarding the benefits of the informal learning environment they attended including a) active and experiential learning b) Visualisation of knowledge and better understanding of the scientific concepts c) Familiarisation of alternative teaching methods and technological applications connected to knowledge d) Development of social skills and ecological awareness.

D. STUDENTS' SUGGESTIONS

An important aspect that students emphasised in their open-ended responses, is that the informal learning activity has to be adapted according to the age and academic level of participants. Their suggestions regarding their museum's visit can be summarised as following:

Need to update audiovisual material and to seek scientific information on local and international level: a) on earthquakes and their impact on the natural environment b) on earthquakes' impact on man-made infrastructures, depending on construction's material and height c) on updating simulation process to the means of protection during an earthquake. Students also suggest the customisation of the museum's material and activities to all age groups. Finally, having in mind their future teaching career, they propose the development of a workshop for the psychological support of students and the provision of first aid on school settings, when a natural disaster as an earthquake occurs.

4. DISCUSSION

The main finding of the present study is that students greatly appreciate and highly validate informal learning environments in general as well as the specific workshop they attended.. This is in accordance with the proven efficacy of informal learning in museums. Museums provide a wide range of diverse examples of designs to support learning for audiences ranging from the youngest children to the oldest adults (Crowley, Pierroux and Knutson, 2014; Falk and Dierking, 2010). In general, informal learning has been successfully applied and validated in primary and secondary education (Orion and Hofstein, 1994; Rennie., 2007; Vela et al., 2020). However, the implementation and validation of informal learning in higher education compared to primary-secondary education has been less well studied (Decius et al., 2022).

The high approval of Sciences' students regarding informal learning environments (63% ratings as excellent, 36% as very good) reflects the significance of these learning settings for in depth understanding of the topic and their personal learning, in general (Decius et al, 2022). Their rating increased marginally following the intervention, reflecting rather the fact that the pre-visit responses

had already received a high score. The workshop conducted simply fulfilled their high expectations. The high score that informal learning environments receives already before the intervention emphasises the significant role that informal learning experiences may co-exist alongside a formally structured curriculum, in developing graduates as agents of change for a more sustainable future (Gramatakos et al., 2019). Most of the students were positive in suggesting a stronger integration of formal and informal learning processes to their scientific curriculum. Universities may design strategies to promote informal learning environments. However, the curriculum of informal settings differs markedly from that of formal settings, so different types of assessment need to be designed for capturing informal learning experiences (Bell. et al, 2009 in Mujtaba. et al, 2018).

Students' gains referred mainly to experiential learning and to long term impact on students' science's knowledge (Laursen et al. 2007). Also, a survey of 1019 undergraduate students at the University of Helsinki showed that informal science education institutions had a strong impact on the academic career choices of students (Salmi, 2003). In addition, students' gains referred to daily needs and ecological awareness, in the aspect that science is meaningful and relevant to their daily lives (Feinstein, Allen, and Jenkins, 2013).

The present study also could trace individual students' responses before and after the teaching intervention. The need and type of in class preparation, before the workshop conducted was documented. In class activities including a combination of online material, new technologies and classroom presentation as well as student's feedback afterwards was recorded. Research on field trips finds that organising sequences of pre-visit preparation work in the classroom, guided instruction during the museum visit, and post-visit follow-up work back in school's settings maximises the potential for learning (DeWitt and Storksdieck, 2008; Kisiel, 2006). Also, this pre- and post- intervention documentation of students' responses allows to track baseline beliefs of students regarding informal learning environment and changes of their opinion following their exposure to such a field, as well as to evaluate whether their responses are affected by their current status or future teaching status. The students' responses were very similar, regardless of whether they were asked to respond as students or future Sciences' teachers. This is in accordance with the finding that teachers' beliefs are cognitive constructions representing a personal interpretation of their previous experiences related to school and education (Glava and Glava, 2015).

Finally, the majority of the students would consider implementing informal learning environments to their future teaching practices, evaluating the important contribution of those settings to secondary students' engagement in science and to critical thinking (Mujtaba. et al., 2018). To our knowledge, this represents the first study evaluating the responses of undergraduate Sciences' students visiting a Natural History Museum in Greece, a rather representative sample of Mediterranean Sciences' students visiting a relative to their scientific field informal learning environment. Their feedback can be beneficial both for the Sciences' Faculties as well as for the Natural History Museum, in order for collaborative and synergistic relationships to be developed in favor of students' needs.

Limitations of the present study include the application of a specific type of informal learning to a subfield of Higher Education, with participant students representing a rather convenient than a random sample of the Institution's population. Larger scale studies, validating the performance and acceptance of various types of informal learning to variable Higher Education fields and programs are needed, before the implementation of informal learning settings in Higher Education's curricula. (Decius et al, 2022). Scholars expect that informal learning will become an even more important

part of students' education progressively and should be investigated more thoroughly (Barth et al., 2007; Jamieson, 2009; Peeters et al., 2014).

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19. Sciences' students attitudes toward teaching approaches through arts: A case study

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Abstract. The aim of this case-study was to investigate the attitudes of Sciences' students regarding the transformation of scientific knowledge to school knowledge through aesthetic experience.

The study was implemented within the Teaching Certificate course of the School of Science and Engineering, of the University of

Crete. 42 students from the Departments of Biology,

Physics, Chemistry, Mathematics and CSD were divided to groups according to their discipline and participated to experiential workshops, based on the theory of transformative learning. A three-hour workshop was implemented with visual arts materials (various cardboard, paints, glues, etc.) so that a topic from Secondary Education curriculum to be transformed into an aesthetic construction. The participants presented their final work to the groups in a subsequent three-hour session. Qualitative data was collected through 11 semi-structured interviews by the groups' representatives. Participants confirmed that, although the initial workshop seemed a difficult task, peers' ideas, positive feelings and cooperation disposition motivated them to implement it. They were fascinated by the alternative way of teaching and they were inspired to incorporate activities through arts in their future teaching career. They experienced interest, excitement, calmness and fun and they confirmed the importance of workshops through arts for their active learning as well as their training for being school teachers in the future. Concluding, this study confirmed the positive impact of incorporating workshops through arts to the educational process for Sciences' students. Hence, transformative learning appears to offer another perspective of organised learning, supporting professors differentiate the conventional way of teaching, through unexpected situations in all forms of university and adult education.

Keywords. *Transformative learning, Science Education, aesthetic experience Secondary education.*

1. Introduction

Eisner (2003) maintains that schools often fail to support inclusion of all students with different needs, resulting to their discontent, which, in many cases, is attributed to inadequate curriculum design. According to his theory, education is not only relevant to what can be expressed through language but also to what our mind can process. He argues that different forms of art (dance, music and the visual arts) can enhance both speech and mind development. The use of different forms of representation as a way of sharing various meanings is not a modern human practice. He believes that the main purpose of education is the preparation of humans with an artistic mindset, such as language artists and science artists, who can use their imagination at work, take advantage of the unexpected and develop critical thinking based on feelings and rules. He suggests Emphasising more on the function of arts in education in two ways, either in terms of promoting feelings or as a method that enables the development of critical and creative thinking.

According to Dewey (1897), the use of art in education served two purposes: psychological as well as social, while he perceived it as a way of self-expression, of imagination and creativity. Later on, Grardner (1990), on the basis of his theory of Multiple Intelligences, suggests that art can be regarded as a form of mental activity which demands the processing of various symbols of expression. Nikkhah (2011) states that the integration of art in teaching sciences can lead to the creation of the most effective policies of the new millennium, concerning creative science education. "The arts" is a term that can be considered as more concise in comparison to "art", because "the arts" include music, dance, drama, literature, cinema, etc., while the term "art" usually represents fine arts (painting, sculpture, etc.). "Art" is suggested to be a process which is essential for the completion of every work. According to this theorist, the arts enable people to utilise the environment they are surrounded by, through which communication is promoted, in a perceptive way. This process indicates that the commitment to the arts provides a perspective to life which can be described as more fruitful, more comprehensible and more pleasant. Consequently, Nikkhah (2011) believed that science education is possible to become more creative through artistic activities. The transformation of science through art can optimise science education. Actually, the education methodology and policies of Physical Sciences should be designed in accordance with art as a model to achieve and maintain a harmonious outcome. The connection between Physical Sciences and art will be beneficial to science education and will promote knowledge formation. Science creates insight and insight generates new ideas to further science, shaping in this way an inter – connection between science and art.

Contemporary researchers (Şahin and Dogantay, 2018) argue that the theory of transformative learning works in a parallel way with critical thinking. This theory has been developed based on the standards and main ideas of constructivism. Transformative Learning in Higher Education facilitates the transformation of a learning process which emphasised on the accumulation of knowledge into a more practical process of working through insight until the changing of the meanings to be produced is achieved (Biggs and Tange, 2007). In essence, transformative learning could be perceived as a process which enables the utilization of previous knowledge in favor of the interpretation and forming of new meanings as well as the understanding of words or actions (Mezirow, 2006). At the same time, Raniga and Andamon (2016) underline the importance of transformative learning as an innovation of the higher education curriculum, since it has been welcomed, after being investigated, as an innovative educational practice as far as the sustainability of the built environment of the universities in Asia – Pacific is concerned (field of engineering).

Regarding physical sciences, Higgs (2007) endorsed learning environments whose grounds can be characterised by intersubjectivity while they provide opportunities for the cultivation of various and multiple perspectives, theories and student interests, until they proceed to cross checking outcomes through teamwork so that quality teaching and learning is maintained. Additionally, Tlali (2017) points out the urgent need for the transformation of teaching and learning concerning the field of physical sciences in today's world. According to the theorist, the performance of learners in physical sciences usually fail their expectations, causing doubts about the quality of teaching and learning, as well as questions about the quality of the support provided by teachers.

In recent years, many researchers have focused their attention on teamwork and cooperative learning, as well as the way they benefit not only high school students (Asrori and Tjalla, 2020) but also students who attend university courses (Katsampoxaki – Hodgetts, 2023 · Lobato et al., 2010 · Marin -Garcia and Lloret, 2008 · Watson, 2002). Asrori and Tjalla (2020) studied the effectiveness of a cooperative learning model on the improvement of the skills of secondary and high school students. The experiment was conducted in three high schools, where 105 students (35 from each high school) had to be examined in terms of four personality aspects on the basis of a quasi – experimental design which focused on group formation and the understanding of the importance of teamwork by the participants. The students' profiles had been analyzed both before and after the experiment, so that the researchers could draw conclusions on the perspectives the participants

developed through teamwork. The examination included aspects relevant to sharing, collaboration, respecting the rights and well – being of others, as well as caring about others. The results of the study indicated that collaborative teamwork learning model was effective regarding the improvement of the students' personality traits in these three high schools. All of the personality aspects that had been investigated were improved except the one referring to “respecting the rights and well – being of others” which appeared to show medium improvement.

According to Watson (2002), the development of innovative teaching methods at universities is a major necessity, aiming at promoting essential university students' skills and abilities. She pointed out that activities related to teamwork do not focus only on one skill, but on many more. Moreover, she maintains that collaborative teamwork learning is grounded on experiential learning. She focused her attention on the importance of collaborative teamwork teaching and learning, emphasising on the development of autonomous students' skills and abilities while working in a group. She believes that university students have more power and control when it comes to decision making. They have the opportunity to learn through interaction, they have the freedom of choice, thus they are benefited emotionally without feeling the need to refrain from working. She also remarks that teamwork is an indirect system of guidance and monitoring. Although, the researcher recognises the prospects of collaborative teamwork teaching and learning, she admits that any innovation is likely to require time in order to be accepted and finally alter our perceptions. The fact that the university students could change their view of learning about law or about themselves was defined as a successful achievement for this innovative method, while they were able to acquire new ideas, skills and attitudes by being exposed to teamwork.

In addition, Marin -Garcia and Lloret (2008) argued that although there is no denying that teamwork has great benefits to show, it is very common for teachers to face difficulties when it comes to implementing or evaluating teamwork process at university. Many are the questions that have been posed about whether teamwork could be adopted when students form a large scale audience or what types of problems may arise during this process.

Lobato et al. (2010) studied the experience of 185 students at the University of the Basque Country by using a questionnaire in order to gather the major competences that teamwork improves, while later on they continued with an intervention and the redistribution of the questionnaire. The analysis of the factors which were included in the questionnaire indicated a structure with two dimension: (1) “interpersonal competences” and (2) “instrumental competences”. The groups that participated in the intervention were formed by 33 students from the Faculty of Psychology who

had to take part in an intervention under the subject of Psychoeducative Interventions, 27 students from the Faculty of Social Education whose intervention subject was Data Analysis and Information, 55 participants from the School of Fine Arts whose intervention subject was Conservation Basic Technologies, 31 Industrial Engineering students whose subject was Hydraulic Machinery, 16 students of Chemical Engineering whose intervention subject was Equipment and System Design and 23 students from the Faculty of Technical Industrial Engineering whose intervention subject was related with Physical Fundamentals of Engineering. The aim of the work was to define some of the educational interventions concerning collaborative learning and the design of a methodology with specific strategies and techniques which can be used for the introduction of teaching and learning of different subjects, with the help of both group and personal attitude reflections. In this method, the involved faculties were asked to integrate teamwork in their curriculum as well as implement self – education based on the educational parameters that would be used in classrooms. Self – education is generated by certain procedures that occur from the same activity experienced by the participants in the group. The intervention was carried out in six groups of students, each one of them guided by a teacher who specialised in the educational innovations of collaborative teamwork learning. At the initial stage of the intervention, the students had been distributed the Questionnaire of Social Cooperative Competences (CSCC), which is a valid and reliable questionnaire, in order to express their views about the importance of the competences they developed in terms of professional performance and the level of integration of the collaborative approach in the assessment of different subjects of concern. The cooperative techniques that were used included puzzles or jigsaws, case studies, complex problem solving, laboratory practice, essay composition or the discussion about practical matters that aim at the proper moral development. After the intervention, the students were passed the same questionnaire and took part in a feedback process between them and the teachers. The researchers concluded that the students tended to prioritise mainly the technical competences over relationship competences (intrapersonal and interpersonal) during the stages of the formative process and assessment of their learning. As a consequence, the most prevailing competences that were developed after the intervention, according to the students, were examined from three perspectives: “self-assessment”, “importance” and “acquisition”, which appear to be relevant mainly to: negotiating, expressing views and ideas, cooperating and sharing, managing conflicts and mediating in cases of conflict, praising and decision making. These competences are relevant to the instrumental competences dimension in comparison to active listening, expressing emotions, forgiving, facing criticism and defending ones rights, which belong to the interpersonal competencies dimension. This preference became evident

through the study of the parameters of “importance” and “acquisition”, while the parameter of “self-assessment” did not seem to demonstrate statistically significant differences.

Moreover, it has been claimed that leaning on the basis of teamwork as a pedagogic strategy aims to involve mentally all students, initially on a personal level and later on as a group, so that all members can reach an agreement in cases where providing answers to different tasks or solving problems is needed. The students are able to complete the task after investigation. In fact, this strategy has replaced the midterm exams in numerous universities, providing opportunities for plan formulation, subject proposal, feedback, cooperation and critical thinking (Katsampoxaki-Hodgetts, 2023). The group, as a method of learning, fosters the active participation of its members and encourages learning in various ways. According to Bedford, Wiebe, Tschida (2008), the active participation of the students is considered to be of major importance in higher education and functions more successfully than the traditional learning strategies.

However, the subject of collaborative teamwork learning as far as the level of higher education is concerned requires further study, as many researchers insist that there are difficulties in the implementation of this approach at universities (Marin -Garcia and Lloret, 2008), whereas others claim that the obstacles that may appear during its application can be overcome (Watson, 2002).

2. Methodology of the present study

The present study is considered to be an action research, also, more specifically a case study. It focuses on a workshop on a specific field of a pedagogical course during its implementation at the University of Crete. Data analysis is supported by qualitative analysis (Robson, 2010). The research took place in the auditorium where the relevant course "School Inclusion of Students with Special Educational Needs" was systematically held, therefore it is considered an action research. A case study refers to a purposefully selected sample that is used for a specific purpose from a much more general sample group, taking into consideration that the participants are being involved in a way that facilitates learning by doing (Krain, 2016).

2.1 Aim, sample and procedure

The aim of this case-study was to investigate the attitudes of Sciences' students regarding the transformation of scientific knowledge to school knowledge through aesthetic experience. Specifically, the study presents students' attitudes and emotions regarding the implementation of a

workshop that focuses on using art (visual arts) in the context of cooperative and experiential learning.

The study was implemented within the Teaching Certificate course of the School of Science and Technology of the University of Crete. 42 students (26% boys, 74% girls) from the Departments of Biology, Physics, Chemistry, Mathematics and Computer Science were divided into groups according to their discipline and participated to experiential workshops, as part of the course during the winter semester of 2022. A percentage of 38% of the participants, were students of the biology department, 33% studied at the department of mathematics, while the remaining percentage studied at the departments of chemistry, physics, technology and materials science and computer science. The participants were asked to be involved in the negotiation of a subject that is relevant to their studies through secondary education books, in order to process it experientially, practically, through an aesthetic approach and more specifically through collage, painting and construction.

A three-hour workshop was implemented with visual arts materials (various cardboard, paints, glues, etc.) so that a topic from the Secondary Education curriculum could take the shape of an artistic composition. The participants presented their final work to the groups in a subsequent three-hour session. Each group chose a topic that wished to discuss, for example, the Physicists chose sound signals or water cycle, the chemists chose chemical compounds while the biologists chose the human body. They had a discussion in the group to negotiate how they would materialize their subject visually. They deployed visual arts and recycled materials. The goal of the next meeting was the presentation of the topic they discussed to the other groups as a mutual learning experience after they had finished their construction or their collages.

During the workshop two CSD students together with the researcher performed the role of the observer in the groups, while recording the emotions of the participants as they received them and collecting photographic material to produce a related video of group collaboration.

Right after the workshop, students were asked to report how they experienced the specific activity and if they believed they gained any knowledge and/or skills, which were recorded in a self-reflection diary. Subsequently, the participants were asked to fill out a google form with open-ended questions about their experience. After a few days, 11 students (representative sample from all departments) were asked to participate in a semi-structured interview

3. Research tools

After the completion of the workshop, a representative of each group lodged the experience of the group about members' collaboration as well as the abstracted members' attitudes about the

information and the abilities they had developed. The participants completed a google form, additionally. After a few days, 11 individual semi - structure interviews were conducted. The basic questions were eight: 1) "Which teaching strategies did you recognize that were implemented in the workshops?", 2) "Do you believe that you have elaborated new ways of communication with your classmates through the workshop?" 3) "Do you believe that creative thinking and imagination can be developed by using visual materials?" 4) "Did you find a workshop with visual arts useful to connect art with science and technology?", 5) "Do you think that you could teach in a practical/ experiential way some courses in Science, Mathematics, etc. in the future?", 6) "Do you think that you could teach the subjects of Science, Mathematics, etc. by dividing your future students in groups ?", 7) "Do you have any feelings that you would like to report?", 8) "Would you like to mention anything else about your participation in this particular workshop?".

CSD students' observation and reflection notes, were also used to triangulate data. The researcher's self-reflection diary was useful, too. Data triangulation refers to the use of one or more methods of data collection and aims to increase validity and reliability in the qualitative method (Robson, 2010). Alongside, the researcher's objectivity was ensured through her study of the relevant literature in-depth, which she was engaged and through the careful analysis of the data collected, so that she remained unaffected by prejudice and personal beliefs (Tsiolis, 2014). According to Avgitidou (2015), the self- reflection diary is a useful tool for the expansion of critical thinking, in order for the researcher to understand the phenomenon she has studied and to support its connection with the literature review. In this way, she could increase the objectivity and reliability of the research. In addition, researcher's objectivity was strengthened by CSD students notes (Tsiolis, 2014).

4. Data analysis

Qualitative data was collected through students' answers into google form, through interviews, along with the observations and the notes from the self- reflection diary. Overall, the responses were similar with many common elements for each tool, which have been used.

Almost all students, regarding the first question "Which teaching strategies did you recognize that were implemented in the workshops?", responded that they experienced the course and they collaborated in groups, so they Emphasised on experiential and team working teaching. In the google form they all referred to the presence of the group but at the same time, they focused on their "active participation" in the group and the existence of "active listening" from the other members. Additionally, several students also supported the presence of inquiry-based teaching and learning.

Regarding the second question “Do you believe that you have elaborated new ways of communication with your classmates, through the workshop?”, the students provided positive answers claiming that “they were introduced to classmates who had been seeing around for years but never knew their names” and found out that they had many common interests. They collaborated very well with them as well as with other students they had never seen from their department. In fact, several claimed that **“they did not expect in such a short time to meet other people and communicate so well”**. In addition, the participants Emphasised on the outcome of the interaction, as it helped “even those who did not often participate in conversations” talk to others. In the end, they Emphasised that this communication seemed very special to them and created many positive emotions.” “The team helped so that problems were solved and each member had a role which contributed to the team’s final results “. Also, “conflicts were managed with respect and understanding”. Another interesting response was “It was a very nice process, but unfortunately, I'm not a person who enjoys collaborations as it's hard for me to feel comfortable with people”.

Regarding the third question “Do you believe that creative thinking and imagination are expanded into using visual materials?” all the participants responded positively and some of them pointed out that “in the past, they couldn’t imagine that they could teach mathematics/science with such materials”. Many of them Emphasised that they wanted to find a different way to teach their future students but didn’t know what they could do”. After this workshop they realised that there are practical and joyful ways to teach a lesson.” In addition, some of them felt the whole process was very “creative because visual arts offer creativity “by nature”” and many other students underlined the “value and importance of developing students' imagination through such workshops”. Some responses mentioned that this workshop was a “source of inspiration for future choices”. Indicative responses: “It's exciting to learn new ways you can do your job. I work in a private tutoring and the workshop helped me a lot to develop new methods of transmission.” «It helped me become more creative and get imaginative and start dreaming about my own classroom and how I'm going to apply all that I've learned and how I'm going to make my students feel all this variety of emotions”.

Regarding the fourth question “Did you find a workshop with visual arts useful to connect art with science and technology?” the participants answered in a very large percentage positively. A few of them pointed out that they “may need more knowledge” about visual arts to use it as a medium to teach in the future. A small percentage of students pointed out that “it is difficult for them to think of such ways to use them in the future and that a single workshop is not enough”. In general, however, they argued that they gained knowledge about the topic they discussed through the use of visual arts in an experiential and practical way. An interesting and indicative response: “at

first it seemed difficult for me to do something like this in the context of Physics. But I'm glad that the ideas of my classmates made me think about other things, later. I liked that everyone's ideas complemented each other's thoughts until we arrived at the final result”.

Regarding the fifth question “Do you think that you could teach in a practical/ experiential way some courses in Science, Mathematics, etc. in the future?”, the students responded positively but they mentioned, for another time, that they need more workshops like that because they should have more knowledge and skills to use this method in the future. However, they found practical/ experiential strategy to be "a very interesting form of teaching for some students who have learning difficulties (eg students with dyslexia) or who speak a different language". A great number of participants argued that physical science (PS) and mathematics are being taught systematically by using the board. Anyway, “they considered that practical strategies could support students to understand even if they have some difficulties”. However, it was pointed out that this strategy of engagement with mathematics was very creative and developed their imagination." An interesting answer: "Indeed, I got so much information about my teaching subject through the workshop, that maybe I wouldn't have gotten otherwise, in such a way that I have finally saved it and might use it at any time in future.”

With regard to the sixth question) “Do you think that you could teach the subjects of Science, Mathematics, etc. by dividing your future students in groups?”, although all of the participants answered positively, a small percentage answered that "they don't know how to connect mathematics with art, so it's difficult to apply it as a teaching technique”. However, some of them mentioned again that **"they were thinking of simple ways to teach their future students and this workshop seemed like a good solution"**. An indicative response was: “we got to know each other and left behind the taboo of our age and our belief that we can no longer be involved in handicraft”.

At the seventh question “Do you have any feelings that you would like to report?” most participants expressed positive emotions: joy, excitement, satisfaction, etc. Very few students reported that they initially had negative feelings: discomfort, anxiety and tension, etc. until they became familiar with their group and understood what they had to do. Also, some reported they felt concerned: they had difficulty joining the group and solving a problem, especially at the beginning of the workshop. Indicative answers: "It was a very beautiful process, which although it created anxiety and stress for me because of the need to complete a task in a specific period of time, in the end the feeling was so beautiful". Interesting answers: “it was such beautiful experience and it

offered me ideas for the future!". "It was an attractive experience through which we familiarised ourselves with each other while collaborating and feeling good".

Finally, at the last question "Would you like to mention anything else about your participation in this particular workshop?" the science students agreed that while at first it seemed difficult for a science workshop to be implemented through the arts, at last their classmates' ideas and communication encouraged them to think positive for such strategies. Most of them were captivated by teamwork and the impact of art and they acquired ideas for applying new methods in practice. They developed multiple positive emotions: safety and calmness, joy, excitement from working together, gratitude, interest, hope, love, pride, fun and inspiration. Science students testified that the workshop was "one of the most important courses they have been involved, unique and experiential, very useful for supporting them **understand what kind of teachers they would like to become,...** so they should participate more systematically in workshops" and finally, "it was one of the greatest courses I have ever been taught, a unique and experiential course, very useful".

5. Conclusions

From the science students' answers into google form, the interviews, the researcher's self-reflection diary as well as the two CSD students' observations, it appeared that the workshop caused concerns, but it was also pleasant for the students. Participants realised that experiential and teamwork strategies could function for the teaching Maths and Science, despite their concerns whether they are able to apply them themselves. They felt that knowledge can be imparted through such workshops in their subjects, although it became evident through their answers to the fifth question that they tended to associate the workshop with students with difficulties. They all agreed that the workshop was interesting and despite their initial emotions of anxiety about joining the group, they admitted in the end that they were satisfied. They realised after all that there are "**many ways to teach and learn**".

Participants confirmed that, although at the beginning workshop seemed a difficult task, peers' ideas, positive feelings and cooperation disposition motivated them to implement it. They were fascinated by the alternative way of teaching and they were inspired to incorporate activities through arts in their future teaching career. They experienced interest, excitement, **satisfaction**, calmness, fun and inspiration. They confirmed the importance of workshops through arts for their active learning as well as their training for being school teachers in the future. Science students argued that they learned through teamwork, by harmoniously overcoming difficulties and listening

to each other while sharing thoughts and ideas. This study confirmed transformative learning theory's impact on the participants, as it developed through organised learning with social interaction and evaluated the importance of integrating Arts in Sciences' teaching process.

Science students reported the importance of the workshop in order to expand their creativity, imagination and cognitive processes, skills which advanced through the use of art (Dewey, 1897). Additionally, Nikkhah (2011) emphasised that the teaching of science becomes more creative through artistic means. The transformation of science through the arts can optimise science learning, and strategies in the Natural Sciences should follow the arts as a model for achieving and maintaining harmony.

The students' responses seem to be in agreement with the basic principles of transformative learning as an innovation in higher education (Raniga and Andamon, 2016) as they argued that they didn't initially believe that such practices could be used for physical sciences teaching. In addition, they agreed that obviously knowledge is produced through this process, and that was something they didn't expect at the beginning of the workshop. In agreement with transformative learning, the main goal is changing of meanings, which is being offered by the accumulation of information (Biggs and Tange, 2007).

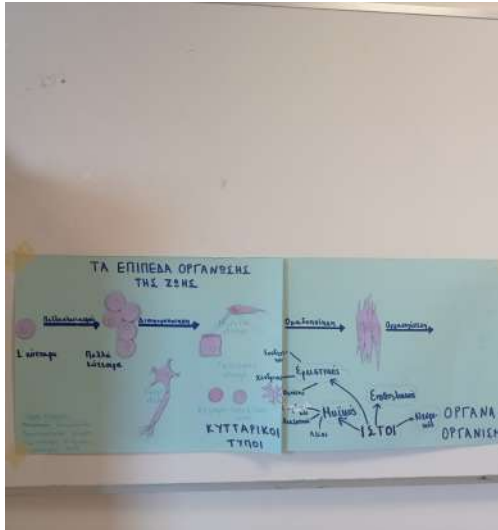
Additionally, students supported the importance of teamwork, in agreement with Watson (2002) who emphasised that the success of teamwork is related to achieving changes in students' attitudes regarding learning and themselves, developing a set of new ideas, skills and behaviours. Despite the fact that the science students reported their difficulties in participating in teamwork, at the same time, they supported that cooperation generated a common cognitive result, drawing inspiration from other members, in the end. In parallel, they seem to agree with the research by Lobato et al. (2010) on increasing interpersonal skills through teamwork. Participants claimed that the team helped to solve problems, as each member assumed a specific role and contributed to the outcome, managing conflicts with respect and understanding each other. One of the most significant remarks was that they shared ideas by listening carefully to their classmates, as it was mentioned in the answers to the second question.

Finally, taking into account student observations and the self-reflection diary notes, it seems that the students increased their active participation in the course, as even those who didn't often participate became active into groups, fact which is considered particularly important for higher education according to Bedford, Wiebe, Tschida (2008).

The present study is considered to be an action research with a case study, which is an important limitation regarding generalisation of results. However, it would be particularly useful to

investigate students' attitudes from different universities as far as their participation in teamwork and experiential activities on science and technology subjects is concerned. It would be also useful to obtain information regarding the difficulties students face in joining groups as well as regarding the strategies professors use in order to support students' active participation in a group.

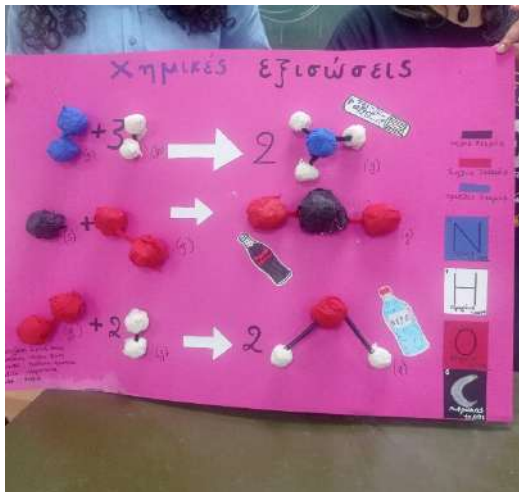
Appendix with examples of student work



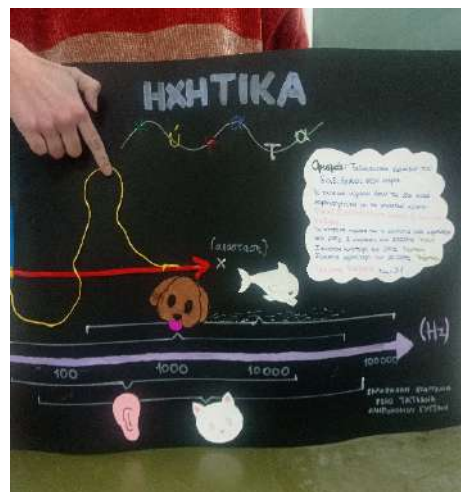
Pic. 1: The levels of life organisation



Pic. 2: Water cycle



Pic. 3: Chemical compounds



Pic. 4 Sound signals

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Section E

**Learner-centred digital
innovations towards
digital equity**



20. The Future Of Higher Education: Critical Thinking in the Era of Artificial Intelligence

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thinking and evaluates their effectiveness when incorporating chatbots. The results highlight both positive and negative impacts of chatbots on students' critical thinking abilities. Practical examples and case studies from PRIGO University are provided to illustrate the effectiveness of chatbot integration. The paper emphasises the need for further research and experimentation to explore the implications of incorporating AI into education and its impact on critical thinking.

Abstract. This paper aims to provide a comprehensive overview of the potential benefits and challenges associated with the use of chatbots in education and their impact on students' critical thinking skills. With critical thinking skills being essential in education, the integration of artificial intelligence (AI) through chatbots offers potential benefits and challenges. The study reviews current methodologies for teaching critical

Keywords *Chatbots; Education; Critical thinking skills; Artificial intelligence; Student engagement*

1. Introduction

In the rapidly evolving landscape of education, cultivating critical thinking skills among students has emerged as a fundamental goal. This article aims to explore the potential benefits and challenges associated with the use of chatbots in education and their impact on students' critical thinking abilities. Critical thinking skills are highly valued in education as they enable students to analyze, evaluate, and generate innovative solutions to complex problems (Quieng et al., 2015). In recent years, chatbots have gained popularity in higher education settings, providing valuable assistance to students and teachers in addressing educational queries and mundane tasks (Eguaras et al., 2021).

Chatbots, characterised by their ability to engage in interactive conversations, can serve as educational scaffolds to foster the development of AI-Thinking skills. By employing human-centred AI reasoning, chatbots enable students to enhance their critical thinking skills in an AI-driven learning environment (Essel et al., 2022). The integration of artificial intelligence (AI) in education aligns with the principles of computational thinking, which encompasses logical reasoning, critical thinking, and analytical thinking (Kooli, 2023). As AI technologies continue to advance, incorporating them into educational practices has become crucial to equip students with the necessary skills for the future.

While the potential benefits of utilizing chatbots and AI in education are substantial, it is important to acknowledge the challenges and limitations that arise in this context, particularly with regard to ethical considerations (Kooli, 2023). This paper seeks to review existing methodologies for teaching critical thinking and evaluate their effectiveness when chatbots are employed to enhance students' critical thinking skills. Through specific examples and study results, both the positive and negative impacts of chatbots on critical thinking skills will be examined.

Furthermore, this article will provide practical examples and applications of artificial intelligence within the educational setting, drawing from the experiences and implementations at PRIGO University. The case study approach will be employed to illustrate the effectiveness of incorporating chatbots into education and the subsequent impact on students' critical thinking abilities.

It is important to note that this article recognises the need for further research and experimentation in the realm of incorporating artificial intelligence into education and understanding its broader implications for critical thinking. By delving into this topic, we aim to contribute to the ongoing discourse and emphasise the significance of continued exploration in this domain.

In the subsequent sections, we will delve into the role of chatbots in higher education, the potential of chatbots as educational scaffolds for AI-Thinking skills, the evaluation of chatbots' impact on critical thinking skills, practical applications and case studies from PRIGO University, and conclude by highlighting the need for further research in this area to deepen our understanding of integrating artificial intelligence into education to enhance critical thinking skills.

2. The Role of Chatbots in Higher Education

The integration of artificial intelligence (AI) technologies in education has witnessed significant developments in recent years, revolutionizing various educational fields (see e.g. Wood et al., 2021; Lucena et al. 2019; Xu and Ouyang, 2022). This section focuses specifically on the role of chatbots in higher education and explores their potential impact on teaching and learning processes, student engagement, and the personalization of educational experiences (Huang et al., 2021).

2.1 AI in Education: Benefits and Challenges

The use of AI in education offers numerous advantages, including improved teaching and learning processes, enhanced student engagement, and personalised learning experiences (Huang et al. 2021). Wood and others have addressed the application of AI technologies in healthcare, STEM education, and language learning, highlighting their potential benefits (see e.g. Wood et al., 2021; Lucena et al. 2019; Xu and Ouyang, 2022). However, the implementation of AI in education also presents challenges, such as ethical considerations, the need for teacher training, and the potential disruption of traditional educational practices (Akgun and Greenhow, 2021; Benuyenah, 2023; Kwon 2023). Ongoing research and debate exist surrounding the impact, effectiveness, and ethical implications of AI in education (Holmes and Tuomi, 2022; Sheng, 2023; Yu and Yu, 2023). Thus, it is crucial to consider both the potential benefits and limitations of AI in shaping the future of education (Slimi, 2021; Ogata et al. 2023).

2.2 Chatbots in Education: Applications and Opportunities

Chatbots have emerged as valuable tools in education, offering unique opportunities for communication and information exchange within digital learning environments (Wollny et al., 2022). In the context of education, chatbots have been successfully applied in various areas, including mentoring, personalizing learning experiences, and improving learning outcomes (Wollny et al., 2022; Tlili et al. 2023; Kuhali et al., 2023). For instance, they have been used to stimulate and sustain interest in language courses and improve learning outcomes in project-based courses (Fryer et al., 2017; Kumar, 2021). Additionally, chatbots have been instrumental in enhancing museum experiences within history education (Noh and Hong, 2021). Furthermore, chatbots can automate administrative tasks such as scheduling and answering frequently asked questions, enabling teachers to allocate more time to teaching and mentoring (Harry, 2023). Nevertheless, while the use of chatbots in education is widespread, further research is needed to fully explore their potential and address associated challenges (Dimitriadou and Lanitis, 2023; Følstad, et al. 2021).

2.3 Chatbots in Higher Education: Enhancing the Student Learning Experience

In higher education, chatbots hold significant potential for enhancing the student learning experience and providing personalised support (Winkler and Söllner, 2018; Wollny et al., 2021; Essel et al., 2022). They can contribute to the development of key competencies required by future managers, such as decision-making, analytical thinking, and technological awareness (Winkler and Söllner, 2018). Moreover, chatbots can support students in making judgments, receiving and giving feedback, and cultivating critical thinking skills (Winkler and Söllner, 2018). By functioning as learning agents, service assistants, and virtual teaching assistants, chatbots can enhance student learning outcomes and performance (Pérez et al., 2020; Essel et al., 2022). However, the adoption and effectiveness of chatbots in education remain areas of ongoing research (Eguaras et al., 2021; Kuhali et al., 2022). It is crucial to consider their potential benefits and limitations, including ethical concerns, and to conduct further research on their impact on student engagement, satisfaction, and learning outcomes (Zhu et al., 2021; Kuhali et al., 2022).

Understanding the role of chatbots in higher education is critical for harnessing their potential and maximizing their benefits in the pursuit of innovative and effective educational practices. It is a crucial and important matter to consider chatbots and their relationship to critical thinking.

3. Chatbots and Critical Thinking: Advantage or Threat?

Chatbots can serve as educational scaffolds for developing AI-thinking skills, offering personalised instruction and enhancing critical thinking and problem-solving abilities (Nadarzynski et al., 2019; Chen et al., 2020). They provide interactive and adaptive learning experiences, offering immediate feedback and guidance to students (Schachner et al., 2020). Additionally, chatbots stimulate higher-order thinking skills by posing challenging questions and encouraging analysis and evaluation (Setiawati and Corebima, 2017; Jaiswal et al., 2021). They also contribute to the development of AI literacy and ethical considerations by providing information on AI applications, limitations, and ethical implications (Oh et al., 2021;

Zhang et al., 2020). However, the design and implementation of chatbots should be carefully considered to ensure effectiveness and acceptance among students (Nadarzynski et al., 2019; Li et al., 2021). Further research is needed to explore their potential as educational tools and their impact on AI-thinking skill development (Tlili et al., 2023; Mahmoud, 2022). By integrating chatbots into educational settings, students can enhance their AI-thinking skills, preparing them for an AI-driven world (Jaiswal et al., 2021; How and Hung, 2019). Pedagogical design and ethical implications should be addressed when utilizing chatbots in education (Akgun and Greenhow, 2021; Rusandi et al., 2023).

3.1 Advantages and Disadvantages of a Chatbot

AI chatbots offer several advantages in education. Firstly, they provide 24/7 availability, ensuring students can access educational resources and support whenever needed (Zhang et al., 2020). Secondly, AI chatbots personalize the learning experience by offering customized feedback and guidance to individual students (Wang et al., 2023). They also foster student engagement and motivation through interactive and human-like conversations (Klímová and Seraj, 2023). Moreover, AI chatbots improve learning effectiveness by enabling personalised learning, adaptive testing, and predictive analytics (Chang et al., 2021; Wang et al., 2023). They prove beneficial in language learning, course instruction, and educational support (Ghayoomi, 2023). Additionally, in healthcare education, AI chatbots can enhance efficiency by supporting clinical decision-making and providing patient education (Sallam, 2023). Overall, AI chatbots have the potential to transform education by enhancing accessibility, personalization, and effectiveness in teaching and learning processes (Adiguzel et al., 2023).

While AI chatbots in education have numerous advantages, it is important to acknowledge the associated disadvantages. One major concern is the acceptability and user willingness to engage with AI-led chatbots (Nadarzynski et al., 2019). Moreover, the effectiveness of chatbot interventions in promoting physical activity, healthy diet, and weight management remains inconclusive (Oh et al., 2021). Challenges arise regarding the knowledge base requirement of chatbots and the potential for perpetuating biases or generating plagiarized content (Cheng et al., 2021; Khalil and Er, 2023). Additionally, the use of AI chatbots in education is still in its early stages, with limited empirical studies exploring effective learning designs or strategies (Kasneci et al., 2023). Ethical considerations, privacy concerns, and cultural differences also pose significant challenges when implementing AI chatbots in education (Adiguzel et al., 2023). It is crucial to carefully consider these disadvantages and address them to ensure responsible and effective utilization of AI chatbots in educational settings.

Table 1 Overview of the advantages and disadvantages of using chatbots according to current research.

Advantages	Disadvantages
24/7 Availability	Acceptability and User Engagement
Personalized Learning	Effectiveness in Specific Interventions
Increased Student Engagement	Knowledge Base Limitations
Enhanced Learning Efficiency	Potential for Biases and Plagiarism
Support for Language Learning	Limited Empirical Studies
Automation of Administrative Tasks	Ethical Considerations and Privacy Concerns

Source: own processing based on literature research

Table 1 provides a concise summary of the advantages and disadvantages of chatbots in education, highlighting the importance of perceiving these aspects in the context of critical thinking.

3.2 Critical Thinking in the Context of Chatbots

In the context of this article, it is crucial to examine current methodologies for teaching critical thinking and their relevance to chatbots in education. Active teaching strategies, including problem-based learning (PBL), concept mapping, debates, case studies, laboratory activities, and inquiry-based learning, have been shown to effectively enhance critical thinking skills by engaging students in analytical and evaluative tasks. Moreover, explicit instruction in critical thinking principles, combined with subject-specific instruction, has proven effective in fostering critical thinking abilities. Strategies such as group discussions, analytical questioning, and the integration of technology, such as web-based resources and digital platforms, have also been successful in promoting critical thinking. Creating a supportive learning environment that encourages critical thinking and provides opportunities for real-world application of knowledge is essential for teachers. By combining active teaching strategies, explicit instruction, and authentic learning experiences, educators can effectively cultivate critical thinking skills in students.

Chatbots offer the potential to enhance critical thinking skills across different contexts. Metacognitive skills, crucial for developing critical thinking (Magno, 2010), are also involved in therapeutic applications of chatbots in mental health, such as delivering cognitive behavioural therapy and social skills training for individuals with autism (Zhu et al., 2021). In addition, chatbots can facilitate self-disclosure as users may feel more comfortable sharing personal information with a chatbot compared to a human (Ho, et al., 2018). Trust in chatbots is vital for their effectiveness, as users seek quick and consistent feedback when they require assistance (Nordheim et al., 2019). In the field of education, chatbots have been utilised for personalised learning, mentoring, and promoting critical thinking skills (Wollny et al., 2021; Klímová and Seraj, 2023). However, it is essential to consider the design and language variations of chatbots, as they can impact user experience and acceptance (Chaves, et al., 2021). While chatbots have the potential to support critical thinking development, their effectiveness relies on factors such as context, user perception, and design considerations.

Within education, chatbots demonstrate promise in fostering critical thinking skills. In language learning, they have been used to enhance language skills and encourage critical thinking (Hew and Fryer, 2021). Furthermore, chatbots have been employed in mentoring scenarios to stimulate metacognitive thinking (Wollny et al., 2021). Research has explored the impact of chatbots on critical thinking skills across various subjects, including science (Barsoum et al. 2022; Pradana et al., 2020) and chemistry (Bruno, 2023). Studies have also investigated the relationship between critical thinking disposition and learning outcomes, highlighting the significance of critical thinking in education (Bell and Loon, 2015; Chen et al., 2020). However, it is important to note that chatbots should not be viewed as a substitute for higher-level interactions and critical thinking (Xu et al., 2021). While chatbots have the potential to support critical thinking development in education, further research is necessary to explore their effectiveness and optimal design.

4. Practical Applications and Future Directions

In this section, we present a framework for the implementation of chatbots in teaching at universities, considering both the advantages and disadvantages identified through existing studies. Building upon the findings of research conducted thus far, we aim to provide practical insights into harnessing the potential of chatbots while addressing the associated challenges.

Incorporating chatbots into university teaching can lead to several innovative applications that harness their benefits while promoting critical thinking skills:

- **Scaffolding Critical Thinking:** Chatbots can serve as educational scaffolds by providing guided prompts and questions that stimulate critical thinking. They can encourage students to analyze, evaluate, and reflect on course materials, fostering higher-order thinking skills.
- **Adaptive Learning Experiences:** Chatbots can adapt their interactions and content delivery based on individual student needs, tailoring the learning experience. This personalised approach promotes critical thinking as students engage with content that matches their cognitive abilities and challenges them appropriately.
- **Real-Time Feedback and Reflection:** Chatbots can provide immediate feedback on students' reasoning and problem-solving processes. This feedback prompts students to critically evaluate their own thinking, identify areas for improvement, and make revisions, enhancing their metacognitive skills.
- **Debates and Argumentation:** Chatbots can facilitate online debates and argumentation exercises, encouraging students to present and defend their perspectives. This promotes critical thinking by challenging students to analyze evidence, consider counterarguments, and construct reasoned arguments.
- **Ethical Decision-Making:** Chatbots can present ethical dilemmas or case studies, prompting students to analyze and evaluate various perspectives and develop ethical reasoning skills. This fosters critical thinking in the context of complex ethical considerations.
- **Collaborative Learning Opportunities:** Chatbots can facilitate collaborative learning by promoting discussions and group activities. Through peer interactions, students can engage in critical thinking exercises, such as evaluating different viewpoints and constructing shared knowledge.
- **Integration of Multimodal Learning Resources:** Chatbots can curate and deliver a variety of multimodal learning resources, including videos, articles, and interactive simulations.

This diverse range of materials encourages critical analysis and synthesis of information from different sources.

- **Inquiry-Based Learning:** Chatbots can support inquiry-based learning experiences by guiding students through research processes, posing thought-provoking questions, and providing access to relevant resources. This cultivates critical thinking through active exploration and investigation.

By leveraging the benefits of chatbots in university teaching, educators can design learning experiences that actively engage students in critical thinking processes. Implementing these inventions effectively requires careful consideration of pedagogical strategies, technological capabilities, and ongoing assessment of their impact on students' critical thinking development.

To address the potential disadvantages of using chatbots in the context of critical thinking, certain measures should be taken to ensure their effective implementation. The following practices can help eliminate these drawbacks:

- **Ensuring Transparency and Explainability:** It is crucial to design chatbots in a way that provides transparency about their functioning and decision-making processes. Students should have a clear understanding of how chatbots generate responses and provide feedback. This transparency promotes critical thinking by enabling students to evaluate the reliability and validity of the information provided.
- **Minimizing Bias and Plagiarism Risks:** Developers and educators should ensure that chatbots are regularly monitored and updated to minimize biases and the risk of generating plagiarized content. Incorporating mechanisms for fact-checking, source verification, and citation can encourage critical evaluation of information.
- **Promoting Active Engagement:** Chatbots should be designed to encourage active engagement and meaningful interactions rather than passive consumption of information. Incorporating open-ended questions, challenges, and opportunities for reflection can foster critical thinking skills by prompting students to analyze, evaluate, and synthesize information.
- **Avoiding Over-Reliance on Chatbots:** While chatbots can be valuable learning tools, it is important to strike a balance and avoid over-reliance on them. Chatbots should supplement, rather than replace, human interaction and guidance. Emphasising the role of educators as facilitators and mentors in the critical thinking process is essential.
- **Addressing Ethical Considerations:** Ethical considerations surrounding chatbots, such as data privacy and security, should be carefully addressed. Implementing appropriate measures to protect student privacy and ensure secure handling of personal information is essential for maintaining trust and creating an ethical learning environment.
- **Providing Teacher Support and Training:** Educators should receive adequate training and support to effectively integrate chatbots into their teaching practices. This includes understanding the capabilities and limitations of chatbots, as well as strategies for leveraging them to enhance critical thinking skills. Ongoing professional development opportunities can ensure educators are equipped to guide and facilitate critical thinking activities effectively.

By avoiding these pitfalls and adopting these strategies, the use of chatbots in the context of critical thinking can be optimized to promote meaningful engagement, ethical considerations, and the development of essential critical thinking skills in students.

The future development of chatbots for teaching holds immense potential, albeit with the recognition that research in this area is still in its infancy and technology is rapidly evolving. As technology continues to advance, the landscape of education will undergo significant transformations. Therefore, it is crucial to remain adaptable and responsive to these changes, as the development of chatbots is unstoppable. Moreover, it is essential to acknowledge that students' characteristics and needs evolve even at the earliest stages of education. As chatbots become more sophisticated and encompass a wider range of capabilities, including natural language processing, machine learning, and contextual understanding, their potential for enhancing teaching and learning experiences will grow exponentially. Embracing these advancements and conducting ongoing research will enable educators to leverage the full potential of chatbots, ensuring they effectively meet the evolving needs of students and facilitate their educational journey in a technology-driven world.

5. Overview of practical examples and applications of artificial intelligence in education at PRIGO University

In this section, we present an overview of practical examples and applications of artificial intelligence (AI) in education at PRIGO University. By showcasing how AI is harnessed to enhance teaching and learning experiences, we highlight the innovative approaches employed within our institution. These examples serve as a testament to our commitment to leveraging cutting-edge technologies and forward-thinking pedagogical practices. Through the integration of AI into our educational ecosystem, we strive to optimise student outcomes, foster critical thinking skills, and prepare our graduates to excel in an ever-evolving world.

PRIGO University, as a member of the PRIGO Group. The advantage lies in its affiliation with a comprehensive network of schools spanning all levels of education. This interconnectedness facilitates seamless communication and mutual support among the schools, enabling the transfer of knowledge and experience across all educational domains. Such integration fosters a dynamic environment where educators are continually attuned to students' needs, even amidst intergenerational differences. Our educational strategy rests upon the distinctive PriorityGO protected approach, characterised by individualised teaching, modern didactic methods, and a keen understanding of the demands of contemporary society. Within our country, education is embraced as a lifelong philosophy, a continuous pursuit embedded in one's approach to life itself, rather than merely a means to achieve external objectives.

Teaching at the university focuses on the teaching of subjects in the field of economics and economic policy and administration. Therefore, during the course of study, students must acquire appropriate competences not only in the field of expertise, but also in soft skills, namely Analytical thinking, critical thinking, communication skills, teamwork, problem solving, ethical thinking. It is critical thinking that is key for our students. Ability to critically assess information, arguments and evidence, and draw informed conclusions. This is important for the objective evaluation of political decisions and economic models.

The first step towards the implementation of AI in teaching was a SWOT analysis see Table 2. The next step was to find out which areas are critical for students and, based on that, to use the most effective measures. It was that students have difficulty understanding the text and its subsequent interpretation, which is closely related to critical thinking.

Table 2 *Swot Analysis of strengths, weaknesses, opportunities and threats of AI implementation*

Strengths	Weaknesses
- Enhances critical thinking skills	- Acceptability and user engagement may vary
- Provides personalized instruction	- Effectiveness in specific interventions may be inconclusive
- Offers 24/7 availability	- Knowledge base limitations
- Increases student engagement and motivation	- Influence of design and language variation
- Supports adaptive learning experiences	- Ethical considerations and privacy concerns
Opportunities	Threats
- Further research and development to enhance effectiveness	- Continuous adaptation to rapidly evolving technology
- Integration with advanced technologies	- Limited empirical studies on optimal design and implementation
- Collaboration for innovation and improved educational outcomes	- Potential biases and generation of plagiarized content
- Expansion to diverse educational contexts	- Ethical concerns and data privacy issues
- Integration with multimodal learning resources and collaboration	- Interoperability challenges with existing platforms

Source: own processing

Solution: Implementation of Critical Thinking Development and Text Comprehension Enhancement in Chatbot-Integrated Teaching at Our University

Having identified the need for addressing critical thinking and text comprehension challenges among our students, we have successfully implemented a solution that integrates chatbots into teaching while emphasising these important skills. At our university, we have recognized the significance of nurturing critical thinking abilities and ensuring students can effectively engage with information. Through our comprehensive approach, we have successfully implemented the following steps:

- **Integrated critical thinking curriculum:** We have seamlessly integrated critical thinking development into our university's curriculum across disciplines. Our courses now incorporate activities, assignments, and assessments that foster critical thinking, empowering students to analyze, evaluate, and reflect on information effectively.
- **Explicit instruction on text comprehension:** To enhance students' text comprehension skills, we have provided dedicated sessions and workshops that teach strategies for understanding and analysing text. Students learn to extract key concepts, identify biases, evaluate arguments, and critically engage with the content provided, including that from chatbots.
- **Chatbots as learning companions:** We have embraced chatbots as invaluable learning companions rather than replacements for human interaction. By Emphasising their role as tools for information retrieval, clarification, and practice, we encourage students to actively engage with chatbots while applying critical thinking to the information received.

- **Active learning and critical inquiry:** Our learning activities promote active engagement with chatbots, encouraging students to pose thought-provoking questions, evaluate responses, and engage in debates or discussions. By challenging assumptions, exploring diverse perspectives, and applying critical thinking skills to real-world scenarios, students develop a robust ability to think critically.
- **Guidance on AI-generated text:** Recognising the potential limitations and biases of AI-generated text, we provide students with guidance on critically evaluating information obtained from chatbots. We teach them how to fact-check, cross-reference with reliable sources, consider the context and purpose of the information, and make informed judgments.
- **Digital literacy and ethical AI use:** Our curriculum emphasises digital literacy and responsible information consumption, instilling in students the importance of ethical AI use. We help them understand the ethical implications and potential biases in AI-generated content, ensuring they effectively utilize AI while maintaining a critical mindset.
- **Reflection and metacognition:** Through reflective practices integrated into assignments and assessments, we enable students to evaluate their own critical thinking processes and track their growth. We foster metacognitive skills, such as self-awareness, self-monitoring, and self-regulation, to enhance their ability to think critically and adapt their thinking strategies accordingly.

By implementing these steps, we have successfully integrated chatbots into our teaching practices, enabling students to enhance their critical thinking skills, improve text comprehension abilities, and develop a holistic understanding of AI and its impact on society. Our approach equips students with the necessary skills to navigate the digital age effectively, fostering their growth as critical thinkers and lifelong learners. However, it is still too early to talk about success/failure as we are only at the beginning, and we are still monitoring the situation as well as trends and research in this area.

6. Conclusion

In conclusion, this article has provided a comprehensive overview of the potential benefits, challenges, and practical applications of incorporating chatbots in education, with a specific emphasis on enhancing critical thinking skills. We have explored how chatbots can serve as educational scaffolds for developing AI-thinking skills, and we have highlighted the importance of considering the advantages and disadvantages when implementing chatbots in teaching at universities.

Through our analysis, we have recognised the significant role that chatbots can play in promoting critical thinking by providing personalised instruction, fostering engagement, and offering adaptive learning experiences. However, we have also acknowledged the challenges, such as acceptability, knowledge base limitations, and ethical considerations, which need to be addressed to ensure responsible and effective use of chatbots in education.

Drawing upon the findings and insights from our SWOT analysis, we have proposed a framework for implementing chatbots in teaching, considering the advantages and disadvantages, as well as the specific needs of students in the context of critical thinking and text comprehension. By integrating critical thinking development into the curriculum, providing explicit instruction on text comprehension, and fostering active learning and critical inquiry, we have successfully implemented strategies that enhance students' critical thinking skills and their ability to engage with information effectively.

Moreover, our approach to guiding students in the use of AI effectively while understanding AI-generated text reflects our commitment to preparing them for the ever-evolving technological landscape. By embracing chatbots as learning companions and providing guidance on AI-generated content, we empower students to think critically, evaluate information, and navigate the complexities of the AI-driven world.

As our university, within the broader PRIGO Group, is dedicated to fostering a holistic educational approach, we recognize the importance of intergenerational learning and supporting students at all levels of education. Through collaboration and knowledge transfer across educational levels, we ensure that educators stay attuned to the evolving needs of students, adapt to technological advancements, and continue to cultivate critical thinking skills throughout their educational journey.

In conclusion, the integration of chatbots in education holds tremendous potential for enhancing critical thinking skills and preparing students for the challenges of the digital age. By carefully considering the advantages and disadvantages, implementing effective teaching strategies, and fostering a supportive learning environment, we can harness the power of chatbots to revolutionize education and empower students to become lifelong learners and critical thinkers capable of thriving in a technology-driven society.

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21. Virtual Educational Pathways bridging formal and informal science teaching and learning

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Abstract. This research was conducted in the frames of the ERASMUS+ Project ‘Virtual Pathways: Reinforcing School-Museum Cooperation in COVID19 Times’, where we tested the impact and effectiveness of virtual educational pathways to bridging formal and informal science teaching and learning. The pilot implementation activities made use of the training programs and materials developed in the project and provided quantitative and qualitative evidence for bridging the gap between formal education and informal learning. We assessed the impact of 8 virtual pathways our team designed at teacher and student levels, with 459 teachers and 242 students aged 8-17 years in 41 primary and secondary schools. The Virtual Pathways approach, methodology and materials supported the teachers’ autonomy and belief in the capacity of digitally enhanced science teaching and learning, held strong pedagogical value and were easy to fit the school curriculum. The pilot implementations enhanced the students’ interest in learning about science and boosted their understanding of fundamental scientific facts. Overall, the project represented a cost-effective and equitable complement for schools, igniting and sustaining collaborations with informal science education providers, helping students connect with the world of science and technology.

Keywords. Formal and informal learning; virtual pathways; STEM; school - museum cooperation

1. INTRODUCTION

Educational research and practice have shown that informal learning settings have a positive impact on formal education. Science centres and museums have been a staple in educational programs across Europe, offering interactive exhibits that target school students and families. Unfortunately, the COVID-19 pandemic has disrupted this fruitful interaction between formal and informal education sectors.

In our research that was conducted in the frames of the ERASMUS+ Project of the European Union ‘Virtual Pathways: Reinforcing School-Museum Cooperation in COVID19 Times’ (REF: 2020-1-FI01-KA226-SCH-092545), we tested the impact and effectiveness of virtual educational pathways to bridging formal and informal science teaching and learning at three levels: student, teacher, and institutional/school. This research showed that there is still hope for school communities to access the learning resources provided by science centres and museums even in times of crisis. Over the last two years, the Virtual Pathways’ team worked together to provide opportunities for schools, science centres and science museums to collaborate through small-scale experimental projects that applied agile and user-friendly digital technologies to a selected area of activities, ranging from the first scientific revolution in 1600 to the current Nobel Prize-winning discoveries in an innovative way.

This work provides evidence of how well our approach, methodology and teaching materials, the so-called Virtual Pathways, worked for students, teachers, and schools.

2. METHODOLOGY OF THE VIRTUAL PATHWAYS’ DEVELOPEMENT

Learning science is not the same experience and does not carry the same meaning for everyone. In addition to the varying perceptions of science learning, its nature, objectives and workings, the diversity of science learning instances is also attributable to the variety of personal and institutional circumstances in which it may occur. Thus, the characterisation of science learning objects alone cannot generate adequate momentum for effective and sustainable exploitation of the rich content of digital repositories, unless this content can be accessed by the intended users in purpose-appropriate and meaningful ways. This challenge has been addressed by the Virtual Pathways project through the employment of the concept of Educational Pathways.

An Educational Pathway in the VIRTUAL PATHWAYS project describes the organisation and coordination of various individual science learning resources into a coherent plan so that they become a meaningful science learning activity for a specific user group (e.g., teachers, students, other museum visitors, etc.) in a specific context of use.

Further, Educational Pathways directly serve the priority assigned by the project to the integration of resources scattered in various science museums/centres into the same learning experience rather than the mere selection of resources from a single museum or science center. It should be kept in mind that an Educational Pathway may include only the use of digital content at a distance, without physically visiting the science museum or center (virtual visit), or a combination of using digital content (at a distance or onsite) with a physical visit to the science museum or center (physical visit).

In the VIRTUAL PATHWAYS approach, a Pathway is understood as a dynamic rather than static conceptual tool. In the envisaged optimal function of the VIRTUAL PATHWAYS community, creators of Pathways may revisit, revise, and continually develop their Pathways, or even use Pathways created by others as a basis for creating their own new versions, in a process reflecting

social learning as a course of personal and communal gradual development in the learning community.

The main Virtual Pathways stakeholders are defined according to their roles as users of the Virtual Pathways service as follows:

Teachers: school teachers wishing to integrate the use of such resources in their teaching.

Students: school students who may use such resources either as part of their curricular learning, or in out-of-school learning (e.g., in free time or with family)

Science museum educators or science communication professionals: Staff who prepare science learning or awareness raising experiences for the visitors/users of their institutions (science museums and centres). An additional subgroup here might also be other professionals too related to science communication, including journalists who may search for content relevant to the promotion of informal science learning.

Correspondingly, the contexts of use of the VIRTUAL PATHWAYS may be organised into the following three categories: a) in the school (combined with one of the following two categories), b) in the science museum/centre (physical visit), c) on the Web (virtual visit) in the combinations presented in Table 1.

Table 1. *Contexts of use of the Virtual Pathways service*

In these contexts, individuals and groups may get involved in the use of digital content either in ways pre-designed by someone (e.g., teacher, museum educator), or employing their own creative ways of exploring and interacting with the digital content.

In the science museum/centre (Physical visit)	On the web (Virtual visit)
In connection with the school	In connection with the school
In no connection with the school	In no connection with the school

The Educational Pathways can then be seen as instances located in a system of possible combinations of use contexts, user roles, and varying levels of user independence (Table 2).

Table 2. *Contexts of use, user roles, and user independence*

	<i>In connection with the school</i>		<i>In no connection with the school</i>	
	In the science museum/center (physical visit)	On the web (virtual visit)	In the science museum/center (physical visit)	On the web (virtual visit)
Teachers	usually prestructured (or exploratory)	usually prestructured (or exploratory)	As independent lifelong learners: usually exploratory (or pre-structured)	As independent lifelong learners: usually exploratory (or pre-structured)
Students	usually prestructured (or exploratory)	usually prestructured (or exploratory)	As independent lifelong learners: usually exploratory (or pre-structured)	As independent lifelong learners: usually exploratory (or pre-structured)
(Other) lifelong learners	-	-	usually exploratory (or pre-structured)	usually exploratory (or pre-structured)
Science museum educators or science communication professionals	[structuring activities for others]	[structuring activities for others]	[structuring activities for others]	[structuring activities for others]

Structure of the Educational Pathway Pattern

In many cases, learning experiences should be ideally embedded in a context which provides the means for the preparation of the learner for the learning experience before it takes place, as well as for facilitating the retention and future exploitation of the outcomes of the learning experience for a longer time after it has taken place. This is a fundamental principle in formal education but can also be seen as a useful dimension in informal learning environments. For this reason, the suggested Educational Pathway Pattern involved the organisation of the science learning experience in three steps:

- i) **Pre-visit:** activities preparing for the interaction with the digital learning science resources
- ii) **Visit:** activities involving interaction with the digital science learning resources in or outside the science museum/center
- iii) **Post-visit:** activities rounding up and concluding the learning experience after the interaction with the digital science learning resources. From these, the Visit phase is the core of the learning experience and indispensable in any Pattern. The Pre-visit and Post-visit phases are essential for the realisation of effective connections between school science education with learning activities involving work with science museum/center content.

In practical terms, it has been proposed that teacher and learner activity could be described in the Educational Pathways as an iterative process consisting of the following five teaching phases:

Question Eliciting Activities

-Provoke curiosity: The teacher tries to attract the students' attention by presenting/showing to them appropriate material.

-Define questions from current knowledge: Students are engaged by scientifically oriented questions imposed by the teacher.

Active Investigation

-Propose preliminary explanations or hypotheses: Students propose some possible explanations to the questions that emerged from the previous activity. The teacher identifies possible misconceptions.

-Plan and conduct simple investigation: Students give priority to evidence, which allows them to develop explanations that address scientifically oriented questions. The teacher facilitates the process.

Creation

-Gather evidence from observation: Teacher divides students into groups. Each group of students formulates and evaluates explanations from evidence to address scientifically oriented questions.

Discussion

-Explanation based on evidence: The teacher gives the correct explanation for the specific research topic.

-Consider other explanations: Each group of students evaluates its explanations in light of alternative explanations, particularly those reflecting scientific understanding.

Reflection

-Communicate explanation: Each group of students produces a report with its findings, presents and justifies its proposed explanations to other groups and the teacher.

The above model has been proposed as a guide of appropriate teaching practice built around the observation of objects or phenomena in the natural world – in this case physically or virtually, directly or indirectly, in the science museum/center.

Apparently, the Educational Pathway Pattern is flexible and open to other educational approaches, too, if considered more appropriate in certain circumstances. However, in any case it is advisable to retain the organisation of the activities in a three-step scheme (before, during, after the ‘visit’).

The Educational Pathway Pattern developed in the project that was used for this study was the one describing structured visits bridging formal and informal science learning through a school ‘visit’ (physical or virtual).

In total, eleven VIRTUAL PATHWAYS were developed:

- 1) Galileo and the celestial phenomena (Italy: IMSS) (<https://www.virtualpathways.eu/2022/10/14/galileo-celestial-phenomena/>)
- 2) Galileo’s New World (Italy: IMSS) (<https://www.virtualpathways.eu/2022/10/14/galileos-new-world/>)
- 3) Virtual solar system model (Finland: UH) (<https://www.virtualpathways.eu/2022/10/14/virtual-solar-system/>)
- 4) Virtual Aurora Borealis Pathway (Finland: LAY) (in cooperation with Muse Galilei) (<https://www.virtualpathways.eu/2022/10/14/virtual-aurora-borealis/>)
- 5) Contagious (Sweden: NCF) (<https://www.virtualpathways.eu/2023/02/07/contagious/>)
- 6) Reveal the Past to Probe the Future: From Galileo to Gravitational Waves and Back (Greece-EA) (<https://www.virtualpathways.eu/2022/10/14/galileo-gravitational-waves/>)
- 7) MUSEUM LAB: Animals in a closer look (Greece: NHMC-UOC) (<https://www.virtualpathways.eu/2022/10/14/museum-lab/>)
- 8) The wolf of the fairytales and the wolf of nature (Greece: NHMC-UOC) (<https://www.virtualpathways.eu/2022/10/19/wolf/>)
- 9) Plant and animal’s adaptations in their natural environment (Greece: NHMC-UOC) (<https://www.virtualpathways.eu/2022/10/19/plant-and-animal/>)
- 10) Natural ecosystems of the eastern Mediterranean (Greece: NHMC-UOC) (<https://www.virtualpathways.eu/2022/10/19/ecosystems/>)

11) Pollen's route, seeds' voyage (Greece: NHMC-UOC) (<https://www.virtualpathways.eu/2022/10/19/pollen/>)

The Educational Pathway Pattern for a Pre-Structured Visit by the School Community is described in the 'Intellectual Output 1: VIRTUAL PATHWAYS methodology' (pages 47-51) of the VIRTUAL PATHWAYS Erasmus + Project, here: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.virtualpathways.eu/wp-content/uploads/2022/02/VirtualPathways_IO1_FINAL.pdf

IMPLEMENTATION AND EVALUATION OF THE VIRTUAL PATHWAYS SAMPLE SIZE AND METHOD

In each partner's country, one or more VIRTUAL PATHWAYS have been implemented and evaluated by both teachers and students. In total 459 teachers and 242 students aged 8-17 years old participated in the survey, from 41 primary and secondary schools including some in rural and remote areas.

The implementation of the pathways and the virtual tours at Galileo Museum and Arctic Center were experienced from April 2022 to February 2023.

Data for the evaluation were collected differently for each country, through one or more of the following methods: survey, background questions and self-reported statements on science teaching, transversal competence areas, online and paper questionnaires, science motivation, scientist interest in informal settings, domain specific scientific knowledge, interviews, focus groups, and diaries and logs.

Data were analyzed in several ways, depending on the data sampling method, including ANOVA and SEM, quantitative analysis, pre-post comparisons, analysis of semi-structured text data, narrative thematic analysis, SWOT-like analysis.

For the pre-post comparisons, a two-wave survey design was used to capture differences in students' ratings of the focal constructs before (T0) and after (T1) the implementation of the virtual pathway. Both pre- and post-test surveys were administered online and in-person, assuring the participants of the anonymity and confidentiality of their responses.

For the quantitative analysis and the analysis of semi-structured text data, all constructs were measured with validated scales (Table 3).

Table 3. *Student evaluation scales*

Interest in a Future Science Career (LaForce et al., 2017)	Cronbach's α
I see myself pursuing a career in science.	Pre-test: 0.91 Post-test: 0.94
I expect to take a lot of science courses in university.	
A career in science sounds exciting to me.	
If I had to pick university studies right now, it would be in a science field.	
Science Intrinsic Motivation (LaForce et al., 2017)	Cronbach's α
I find science very interesting.	Pre-test: 0.85 Post-test: 0.89
I enjoy science investigations.	
I want to learn more science.	
Learning about science is fun.	
Science Interest in Informal Learning Experiences (Lamb et al., 2012)	Cronbach's α
I do not enjoy visiting science museums and science centres (reverse coded)	Pre-test: 0.67 Post-test: 0.71
Visiting science museums and exhibits makes me I consider a career in science.	
Visiting science museums and exhibits makes me I want to learn more about a science topic.	

All items are rated on a 5-point Likert type scale (1="strongly disagree" to 5="strongly agree")

First, interest in a future science career, and intrinsic science motivation were measured with scales used by LaForce et al. (2017). Each scale comprises 4 items rated on a 5-point Likert-type scale. Both constructs were found to have good discriminant and internal validity, and test-retest reliability.

Second, science interest in informal learning experiences was measured with Lamb et al. (2012) 3-item scale rated on a 5-point Likert-type scale, showing adequate discriminant validity, and test-retest reliability.

Third, domain-specific knowledge was measured with items taken from the Oxford Scientific Knowledge Scale (Durant, Evans and Thomas, 1989), a validated and widely used instrument to assess public understanding of science (tables 4 and 5).

As far as the teachers' profile is concerned, generally, females were more than males, most of them were up to 30 years old with little or less than 10 years teaching experience.

Regarding the students, there were more girls than boys and most of them were older than 11 years old.

3. RESULTS

Some of the results of the surveys in the different countries are shown below.

Teachers' evaluation

Regarding the training course assessment, teachers were asked to rate on a 5-point Likert-type scale the relative usefulness of the training course they attended (1=very useless, to 5=very useful) and their answer on the question '*How useful do you consider the training course in terms of the effort and time you devoted to it?*' was measured with 3.93.(N=423).

When they were asked *how satisfied they were with the duration of the training course*, most of them replied that the training duration was sufficient (42%) or they would like to have an extra 2-hour training time (37%).

Another key objective of the evaluation was to assess the extent to which the proposed virtual pathway(s) may match best with the school curriculum in each country. Accordingly, **teachers** were asked to rate on a 5-point Likert-type scale the relative easiness or difficulty of integrating the pathway into the curriculum (1=very difficult, to 5=very easy). Regarding the easiness of integrating of the pathway in the multidisciplinary science teaching module with the a) *curriculum*, b) *school timetable* and c) *preparation time*, their answers were 3.66, 3.37 and 2.98 respectively.

Regarding their satisfaction with the virtual tour (at the Galileo Museum), 92% were '*very satisfied*' and 8% '*satisfied*' (N=24)

Some of their comments and impressions about the virtual tour to Galileo Museum were: '*The students were thrilled with the tour, as such an activity was a new experience for them. We talked for quite some time afterward and they were eager to participate in similar activities.*'; '*It was an incredible experience, as we visited online and toured a museum in another country!! Unbelievable!*'; '*The online tour to the Galileo museum attracted enthusiastic participation from my students.*'; '*The presentation was very relevant to projects we've done in the past (astronomy, astronomical instruments) and was attractive, especially to the students participating in our science club.*'

Regarding the teaching and learning effects, teachers' feedback was the following. (The percentages shown represent 'agree' and 'strongly agree' responses combined. N=24.)

The virtual tour to Galileo Museum was likely to be an efficient way to...

- ...help me to move away from the standard curriculum (100%)
- ...motivate my students to increase their interest in Astronomy and Natural Science in more general (95%)
- ...evaluate the understanding my students have regarding the subject topic(s) (90%)
- ...get my students to take the initiative in their studies (85%)
- ...make out-of-school educational activities less costly (85%)
- ...highlight the usefulness of ICTs in my teaching (85%)
- ...change the way I think about ICTs in education (75%)
- ...change the way my students learn (75%)
- ...make me more independent in my teaching (70%)
- ...help those students who tend to be behind (60%)

The Galileo's New World virtual pathway combined with a virtual tour to the Galileo Museum can have an added pedagogical value because... (Percentages shown represent 'agree' and 'strongly agree' responses combined. N=24).

- ...it makes the students think and reflect (100%)
- ...it motivates the students (90%)
- ...it is novel (it is different from other teaching material) (79%)
- ...it is better than other digital educational tools (79%)
- ...it is interactive (63%)

96% of the teachers claimed that the Galileo's New World virtual pathway combined with a virtual tour to the Galileo Museum could be an important addition to their current teaching tools and resources, whereas 96% were effectively supported to innovate their teaching and 92% to make their teaching more motivating and engaging (N=24).

Finally, in figure 1, it is shown what they think about the possibility of gradually integrating tools like Galileo's New World virtual pathway into their teaching or they will remain marginal for the next years.

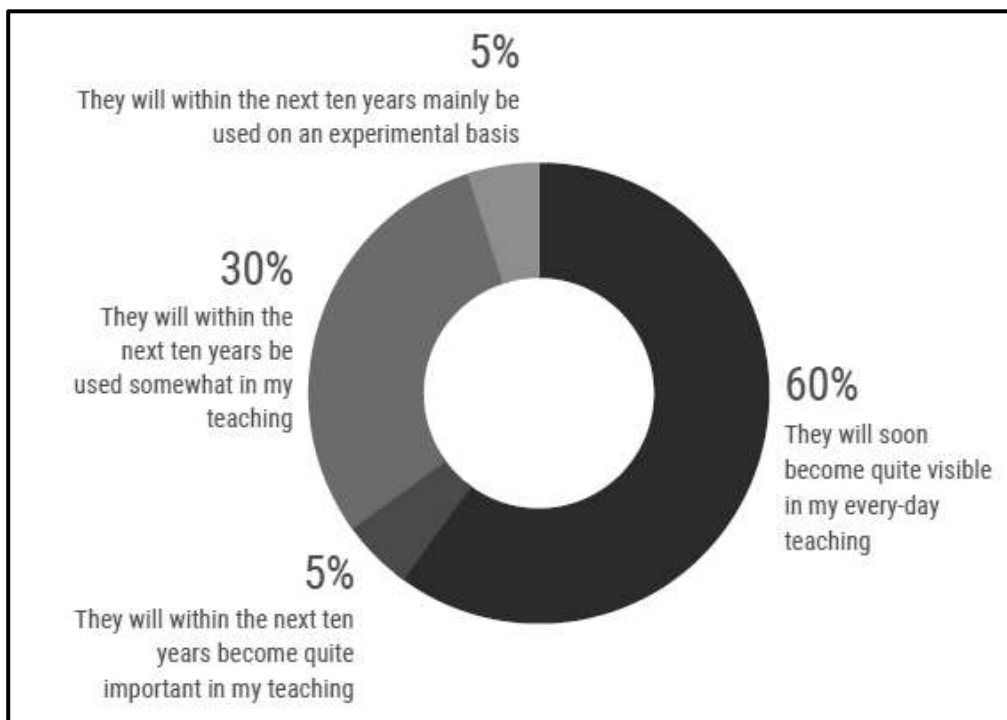


Figure 1. *The results of answering the question Do you think that you will gradually integrate tools like Galileo's New World into your teaching or that they will remain marginal for the next ten years (for the pathway 'Galileo's New World').*

Students' evaluation

The results from the pre- and post- questionnaires that the students filled in on science motivation, are shown in figures 2 and 3.

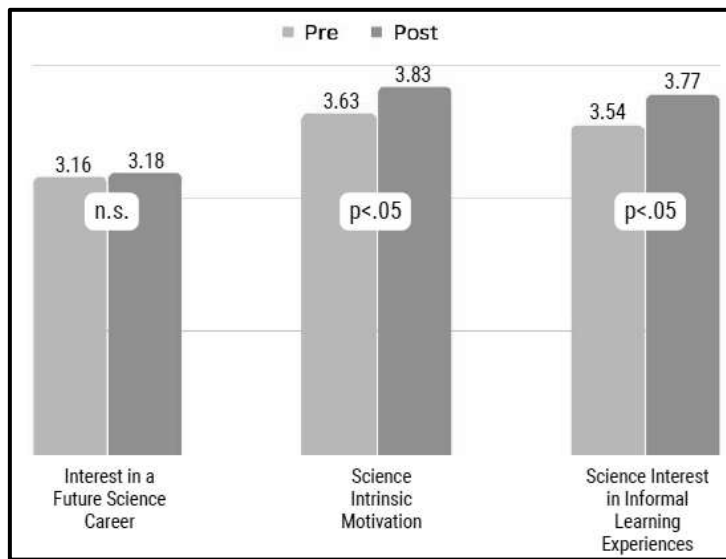


Figure 2. Science motivation and science interest graph from the implementation of the pathway 'Galileo's New World'. N=153. The results shown are based on paired samples t-tests (*p<.05). All measures are rated on a 5-point Likert-type scale (1=fully disagree, 5=fully agree).

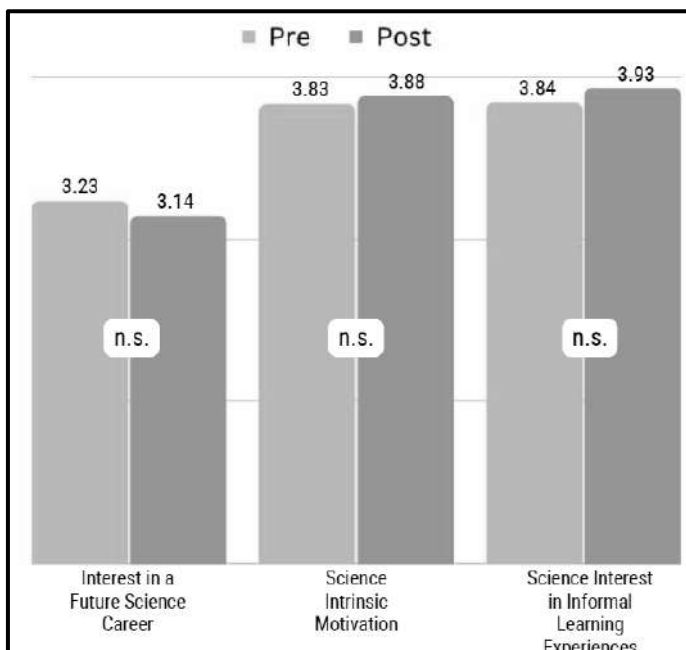


Figure 3. Science motivation and science interest graph from the implementation of the 4 pathways of NHMC-UoC pathways combined (N=89). The results shown are based on paired samples t-tests (*p<.05). All measures are rated on a 5-point Likert-type scale (1=fully disagree, 5=fully agree).

The results from the pre- and post- questionnaires that the students filled in on domain specific scientific knowledge are shown in tables 4 and 5 and figures 4 and 5.

Table 4. *Virtual-pathway-specific knowledge tests for the virtual pathway ‘Virtual solar system model’ (based on Durant et al., 1989)*

Virtual Pathway Title	Virtual Pathway Short Name	Multi-choice Knowledge Test Multiple choices: <i>Yes, No, I don't know.</i>	Knowledge Test Result Calculation
Museum lab: animals in a closer look	VP1	10 statements Example statement: <i>"Animals are divided into vertebrates and invertebrates, depending on whether they have a tail or not."</i>	Percentage of correct answers to all 10 statements. E.g.: 6 correct answers equals to 60%
The wolf of the fairytales and the wolf of nature	VP2	7 statements Example statement: <i>"Wolves are in danger of extinction because humans are destroying their home."</i>	Percentage of correct answers to all 7 statements. E.g.: 3 correct answers equals to 43%
Natural ecosystems of the eastern Mediterranean	VP3	10 statements Example statement: <i>"The ecosystem consists of organisms and abiotic elements such as water and soil."</i>	Percentage of correct answers to all 10 statements. E.g.: 6 correct answers equals to 60%
Pollen's route, seeds' voyage	VP4	10 statements Example statement: <i>"Pollinator insects help plants to reproduce by transferring pollen from flower to flower "</i>	Percentage of correct answers to all 10 statements. E.g.: 6 correct answers equals to 60%

Table 5. *Virtual-pathway-specific knowledge tests for the 4 virtual pathways by NHMC-UoC.*

Astronomy-related knowledge item	Item short name	Correct answer
(1) Does the Earth go around the Sun or does the Sun go around the Earth?	HELIOCENTRISM	The Earth goes round the Sun
(2) If the Earth goes around the sun, how long does it take?	EARTH'S ORBIT	1 year
(3) Of the following, which is the largest, which is the 2nd largest, and which is the smallest? (Solar system, Galaxy, Earth, Universe, Sun, Don't know)	BIG TO SMALL	Largest: Universe 2nd largest: Galaxy Smallest: Earth

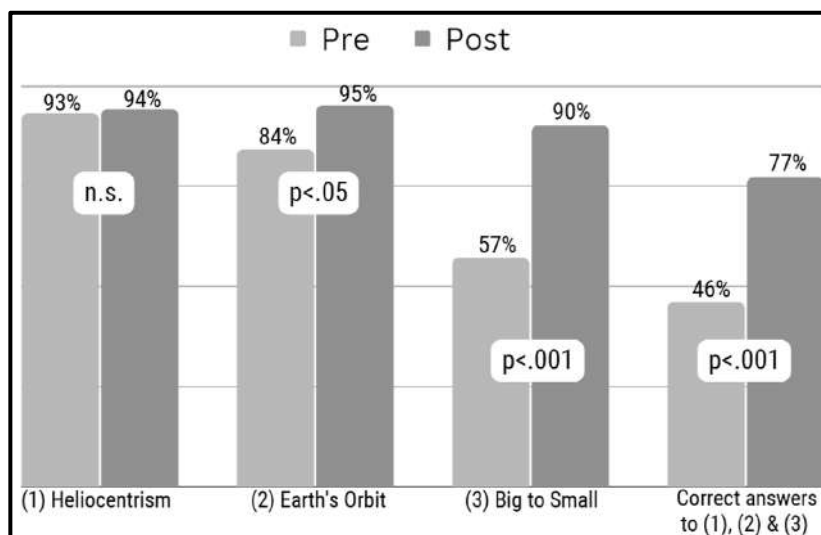


Figure 4. Domain specific scientific knowledge results for the virtual pathway 'Galileo's New World' ($N=153$). The percentages shown represent correct answers. Significant differences are based on paired samples t -tests ($*p < .05$; $**p < .01$; $***p < .001$).

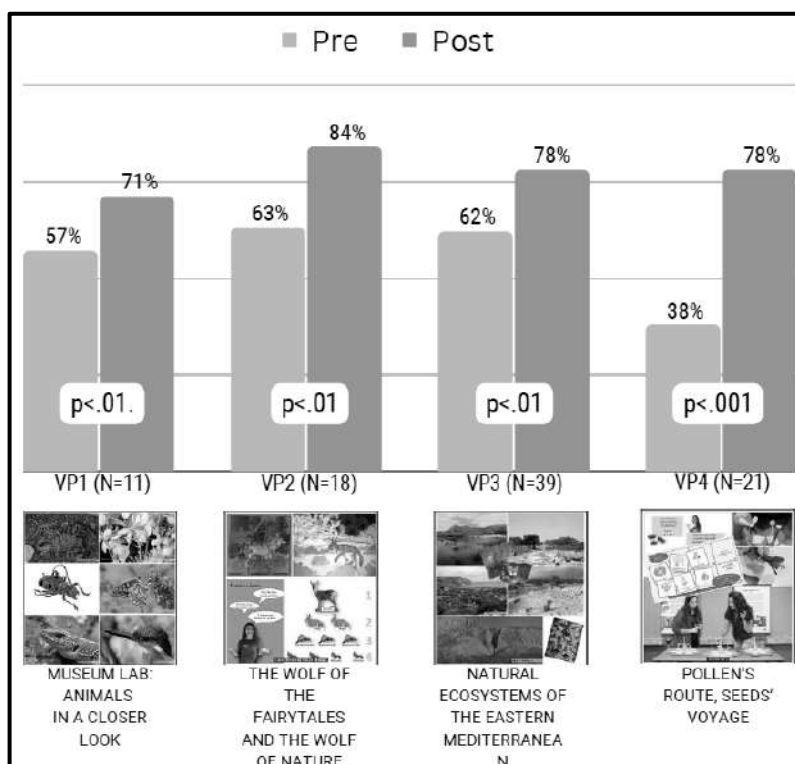


Figure 5. Average percentage (%) of knowledge test scores for the 4 virtual pathways by NHMC-UoC. Significant differences are based on paired samples t -tests ($*p < .05$; $**p < .01$; $***p < .001$).

Regarding students' feedback for the virtual tour (to Galileo Museum), all of them were very satisfied with the virtual tour and all of them would recommend it to their friends. Furthermore, figure 6 shows the most frequent words that appeared from students' comments about the virtual tour to Galileo Museum.

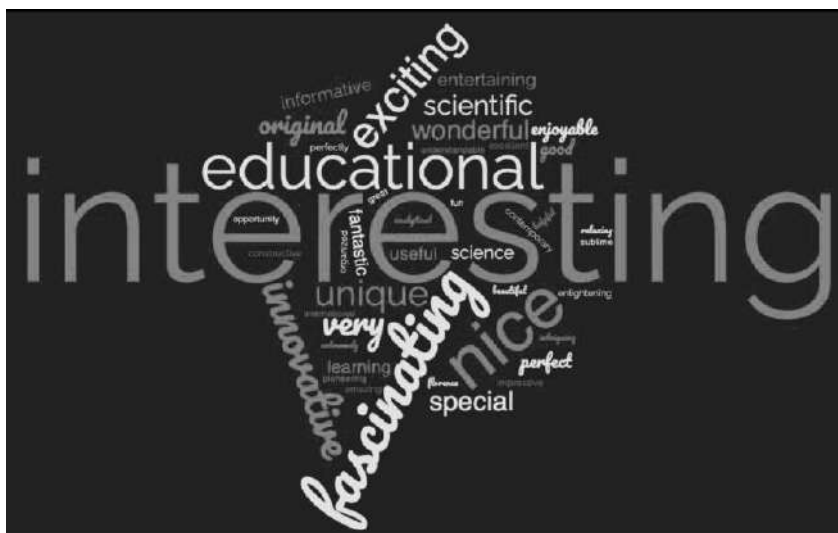


Figure 6. Word cloud displaying the most frequent words that appeared from students' comments about the virtual tour to Galileo Museum.

4. OVERALL CONCLUSIONS AND LESSONS LEARNT

Here, we provide a summary of what we consider the key findings of the implementation of the virtual pathways in each country. Based on these findings, we also attempt to highlight some lessons learnt based on a set of recommendations for further exploiting the projects' outcomes.

Key findings

Virtual Pathways create significant teaching and learning value for both teachers and students.

Teachers

93% of teachers considered using the Virtual Pathways concept, methodology and tools in their practice.

90% of teachers would recommend Virtual Pathways to their colleagues.

Finnish teachers found Virtual Pathways an effective tool for supporting the development of transversal competencies.

Greek teachers found Virtual Pathways helpful in making their teaching more innovative, motivating, and engaging.

Most teachers described Virtual Pathways as a cost-effective digital tool for teaching science that compares better to other available tools.

Students

Quantitative evidence suggests that Virtual Pathways have a significant factual knowledge effect by improving students' understanding of fundamental scientific concepts and facts.

Same evidence shows a significant and positive effect on students' intrinsic motivation and interest in science.

Virtual Pathways, as perceived by teachers, has a notable equity component by offering authentic and engaging science learning activities to students in remote and rural schools that would otherwise be difficult for them to experience due to geographical and socioeconomic factors.

Although the evaluation concerned different educational interventions in different countries with different curricula, the underlying concept, structure, and methodology of those interventions are common. Therefore, it may be feasible to identify common pros and cons, based on which a preliminary list of lessons learnt is to be formulated.

Common pros

The Virtual Pathways solution may be an effective tool for supporting the development of transversal competencies.

Certain digitally enhanced activities, such as the virtual tours at the Galileo Museum, were considered valuable teaching resources, superior to other digital educational tools, and efficient in demonstrating the utility of ICT in teaching.

The Virtual Pathways training sessions were greatly appreciated by teachers, who found the hands-on approach and the opportunity to test the proposed scenarios for themselves extremely useful in their teaching activities.

Common cons

Some teachers expressed the need for additional training due to a lack of basic ICT skills.

The Virtual Pathway solution was not particularly effective in increasing science career motivation, likely due to the brief intervention duration.

Some lessons learnt

Incorporating digital tools and resources, such as Virtual Pathways, into classroom instruction can be a viable and effective approach to enhancing the quality of science education.

Additional training and evaluations may be needed in areas such as ICT competence and multiliteracy to improve feedback.

Virtual tours, like the one offered by the Galileo Museum, can provide valuable science learning experiences for all students, irrespective of their socioeconomic status.

The hands-on approach, practical nature, and timing of training sessions can greatly impact their success, allowing teachers to participate without affecting their regular teaching schedule.

Quality informal science learning experiences, such as those provided by the Virtual Pathways (e.g., Galileo's New World, NHMC-UoC's scenarios), can significantly impact students' science intrinsic motivation, interest in informal science learning experiences, and misconceptions of basic domain-specific scientific facts.

5. In a nutshell

The results of our evaluation suggest that using Virtual Pathways helps students learn better, and that training teachers to use the Virtual Pathways approach works well, but that both schools and informal science engagement organisations still need to make some organisational changes to use it optimally towards eliminating the gap between formal education and informal learning.

One key takeaway from our evaluation is that Virtual Pathways is considered as an innovative and cost-effective pedagogical approach to empower students, especially those who tend to be left behind and motivate them to learn science "outside the box" of the school site by most teachers who collaborated with us.

A second takeaway is that one-size-fits-all approaches to digital and online school education may not be efficient because students have different learning styles and preferences.

Therefore, a more personalised approach that considers the individual needs and circumstances of students can be more effective in promoting their engagement and learning outcomes.

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22. Digital readiness and digital equity in Higher Education: two concepts in dialogue

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Abstract. This study is about higher education teaching proposals that integrate in dialogue two interconnected concepts: digital equity and digital readiness. The content and benefits of both concepts have been long known, however, Covid 19 era showed that not all Higher Education Institutions (HEIs) were prepared to face the challenges of digital synchronous and asynchronous education (Küsel, Martin, and Markic, 2020; Yusuf, 2021).

Since then a new teaching paradigm has been advanced, one that combines digital interaction resources with active learning practices but, also, requires digital competencies in teaching (Rapanta et al., 2020). Yet there are several obstacles to overcome, among which the fact that there are HEI educators that still do not use existing digital education platforms or have a poor understanding on digital accessibility criteria (Fernández-Batanero, Cabero-Almenara, Román-Graván, and Palacios-Rodríguez, 2022). Furthermore it is in practice unclear how the educators' professional and pedagogical digital competences can support the development of all student digital competences according to the European Framework for the Digital Competence of Educators (DigCompEdu) 2.0 (Redecker, 2017). Acknowledging this gap in Higher Education Institutions (HEI), we propose in this workshop digital resources, digital tools and practices that can support and inform digital pedagogy and didactics (Krumsvik, 2014) in different learning environments. Through the discussions produced we aim to cooperatively advance self-awareness and practical proficiency learning strategies (Purina-Bieza, 2021) in a way that may prompt curricula reconfigurations.

Keywords: *digital equity, digital readiness, Higher Education Institutions (HEIs)*

1. Introduction

In the literature of digital teaching and learning, two key concepts stand out: *digital readiness* and *digital equity*. *Digital readiness* was first discussed as a term in the context of Australian professional education, referring only to students regarding their i. preferences and interests, ii. ability to navigate the internet and to communicate through technology, and iii. their ability to autonomously engage in the learning process (Torun, 2020). Nowadays, *digital readiness* concerns both students and educators in higher education (HE) (Taşkın & Erzurumlu, 2021) especially during the Covid-19 emergency remote teaching. During this time, the problem of digital poverty was also pointed out, meaning the lack of digital resources, knowledge, skills and competences in a significant part of HE students and educators (Taşkın & Erzurumlu, 2021).

Digital readiness, as defined above, is closely related to *digital equity*; an evolving concept without a fixed definition (Seale, Draffan & Wald, 2013) that describes a multidimensional research subject with a challenging complex approach (Alexander et al., 2019: 4). The term *equity* is often preferable to *equality* in order to describe a perception change regarding the very dimensions of *equality*. At a basic level, *digital equality* is often connected to the concept of *digital accessibility*. More specifically, it is associated with the right for equal access to new technologies and the development of basic, functional digital skills to navigate the internet, interact in social networks and find digital resources or produce relevant artifacts (Van Deursen et al., 2016). When *digital equality* is not accomplished, people are found to face *digital poverty* and thus the formation of a *digital divide* between those who have *digital skills* and those who do not. In the case of already marginalized or vulnerable social groups that are being deprived of digital information access, the *digital divide* becomes even more imminent (European Agency for Special Needs and Inclusive Education, 2022). At a higher level, *digital equity* is connected to the recognition of the various systemic obstacles (Warschauer, 2004) that are conducive to inequality and are related to factors like low income, geographical distance, social gender stereotypes, disability, different first language, immigration, etc. (UNESCO, 2019: 4). It is, also, linked to educational justice practices to promote all student action and interaction that help gain *scientific capital* (Cope & Kalantzis, 2023), i.e. digital competences that are important for success in all learning areas, socialization and personal success.

From the definition provided so far, one can observe that there are common points of reference (digital skills, digital competences, accessibility) and some differences (digital poverty vs digital divide) that could link both concepts in a causal relationship. Yet, both concepts are dynamic and lay in dialogue in a more elaborate way, since their effects can bring forth cascade effects that may intertwine with scaffolded goals and objectives of digital readiness and digital equity. The complexity of this dialogue raises questions on how students and educators can “navigate around the dangers of diversity and the digital, while harnessing their innovative affordances and inclusive potentials” (Cope & Kalantzis, 2023: 25), especially in HE. The goal of this workshop is to explore the *digital readiness-digital equity*, *digital equity-digital readiness* dialogic relationship, specifically in HE, and provide a digital toolkit that can inform constructive discussions on the topic.

2. Digital equity and digital readiness in HE

In general, *digital equity* is linked to human rights protection, especially the achievement of social justice (La Rue, 2011). However, sometimes emphasis is given on the digital dimension of it with aspects of digital readiness, while other times on its social equity dimension (Galanaki, 2023). Yet, *digital equity* understanding in HE bears no such divisions; it is about the development of *digital skills* and *digital competences* of all counterparts, the achievement of *digital accessibility* (equal access to relevant infrastructures, software and internet connection, substantial high-quality digital content for studying and learning, digital content in local languages, tools and applications for creating, sharing and exchanging digital content), educators who know how to use digital tools and resources, and high quality research on digital technologies application to improve learning (Resta, Laferriere, McLaughlin & Kouraogo, 2018; Resta & Laferriere, 2008). This way, *digital equity* is often linked to educators' digital readiness to handle several technological media, to deal with any arising difficulties (Krumsvik, 2014) and use various digital resources in order to organize synchronous and asynchronous learning environments, evaluate learning outcomes, and navigate at ease within the ever-growing digital learning platforms of academic institutions (Fuchs, Pösse, Bedenlier, Gläser-Zikuda, Kammerl, Kopp, Ziegler & Händel, 2022 in Gaki, 2023).

Furthermore, *digital equity* in HE is linked to the protection of stakeholders' right for an education that advances critical thinking, creativity and emotional well-being. Such an endeavor requires empathy and cooperation between educators and students, as well as opportunities for student active participation and socialization (Aguilar, 2020). Thus, the educator needs to move away from traditional teaching practices and become a guide or facilitator of the learning process in order to provide scaffolded procedural instructions to students (Nguyen, Tuong, Hoang-Thi, & Nguyen, 2022). To do so, educators need to be digitally ready to acknowledge student attitudes, enhance student engagement motivations and reflect on self-efficacy in digital learning environments (Nguyen, Tuong, Hoang-Thi, & Nguyen, 2022).

Hence, *digital equity* and *digital readiness* as a HE objective requires a continuous commitment to the design and implementation of relevant educational strategies (European Commission, European Education, & Culture Executive Agency, 2022: 18). This is why, according to the European Framework for the Digital Competence of Educators (DigCompEdu) 2.0 model there are six different level (A1, A2, B1, B2, C1, C2) educator roles (newcomer, explorer, integrator, expert, leader, pioneer) for advancing all six related categories of digital competences (professional engagement, digital resources use, teaching and learning, assessment, empowering learners, facilitating learners digital competence) (Redecker, 2017). The grid of suggested sub-competences provided though is not to be seen as a strategy map but more as a set of interrelated *digital readiness* and *digital equity* practice guidelines.

3. Moving towards HE digital readiness and digital equity: challenges and obstacles

Recent research data has highlighted the challenges that HEIs need to face in order to achieve *digital readiness* and *digital equity*. There is a need for basic, sustainable digital media and tools equipment that will be accessible to all university staff, a need for educators and other university staff training programs, and a need for communities of practice (Karagözoğlu & Gezer, 2022). At the same time, a curriculum reform is considered crucial with a focus on Information and Communications Technology (ICT) courses to strengthen student digital skills (Karagözoğlu & Gezer, 2022). In the context of these courses new digital multimodal material is expected to be created to make course content both attractive and digitally accessible to all students (Almazova, Krylova, Rubtsova, & Odínokaya, 2020). In addition, it is necessary to investigate and deal with factors (cognitive, emotional, et.c.) that have a negative effect on educator-student involvement with new technologies, especially with digital platforms of synchronous and asynchronous distance learning (Karagözoğlu & Gezer, 2022). That is why multimodal digital content (Schneider et al., 2022) and metacognitive strategies need to be developed by educators (Burleson, 2013; Erarslan & Şeker, 2021) that will support students in their effort to gain essential for achieving *digital equality* metacognitive skills (Almazova et al. 2020; Koumachi, 2019).

Yet there are several obstacles to overcome, among which the fact that there are HE educators that still do not use existing digital education platforms or have a poor understanding on *digital accessibility* criteria (Fernández-Batanero, Cabero-Almenara, Román-Graván & Palacios-Rodríguez, 2022). Other obstacles that educators have to face in their effort to inform their practices are work overload, insufficient collaborative culture, unwillingness in sharing good practices, and their priority on research rather than teaching (Børte, Nesje & Lillejord, 2020). Educators, also, tend to preserve traditional teaching practices (Barak, 2017) or to use technology with the same rationale (Lillejord, Børte, Nesje & Ruudet, 2018). Students again tend to act in a conservative manner as lecture seems to be the most familiar teaching practice to them (Loughlin, Lygo-Baker & Lindberg-Sand, 2022).

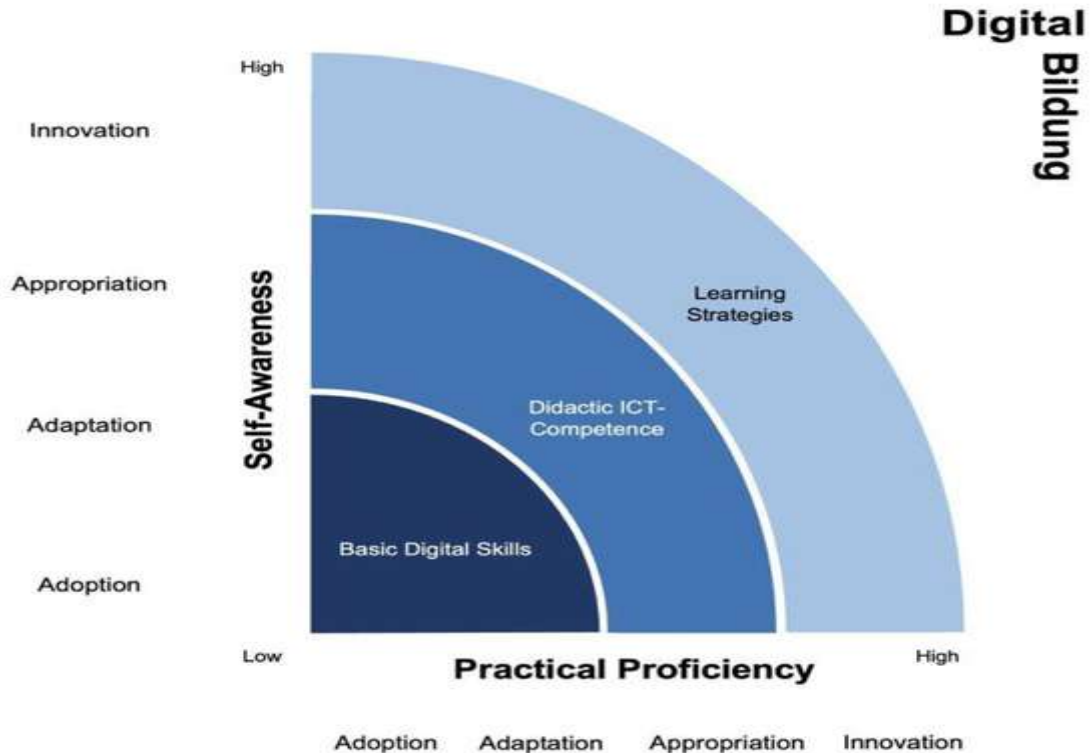
All obstacles and challenges are to inform discussions on the dialogue between digital readiness and digital equity in a way that draws attention to the problem of how to build digital competence in terms of digital didactics and digital pedagogy beyond ICT.

4. A digital competence building model in HE

Educators pedagogically and didactically "build" their *digital readiness and digital equity practices* following a *digital teaching competence* journey in stages (Skantz-Åberg, Lantz-Andersson, Lundin & Williams, 2022). The objective is to advance two parallel processes, that of reflection in order to gain *self-awareness* and that of developing *practical proficiency* in a way that advances the effective organization of teaching and learning (Krumsvik, 2014; Purina-Bieza, 2021; Nguyen, Tuong, Hoang-Thi, & Nguyen, 2022). Based on Krumsvik's (2014) *Digital Bildung* model (see figure 1) and more recent adaptations of it for HE professional digital competences beyond ICT (Galanaki, 2023; Galanaki & Katsarou, 2023) we present a new digital

readiness-digital equity interpretation of the model that can also be used as a self-reflection tool.

Figure 1. The Digital Bildung model



From Krumsvik (2014).

On the first low stage, educators begin building their *elementary* and *basic digital skills*. They first practice on new digital tools and practices with *digital equity-digital readiness* characteristics (Artificial Intelligence tools for literature review, digital accessibility check tools et.c.), and face various technical problems that help them reflect on their attitudes about using digital technology in teaching (Krumsvik, 2014) or their *digital readiness-digital equity* adequacy, since plain digital technology use does not ensure *digital accessibility* in teaching and learning content (Fernández-Batanero, Cabero-Almenara, Román-Graván, & Palacios-Rodríguez, 2022). In this way educators can gradually be ready to *adopt* and *adapt* their scientific subject specific practices to meet the criteria of *digital accessibility* (style structured and readable by text reading tools content, alternative access to digital information content, use of digital accessibility assessed tools, resources and learning environments) (Galanaki, 2023).

In the next stage, educators expand their way of thinking and acting by using the knowledge they have acquired in teaching to develop their *digital didactic competence*. As they further understand the scope, limitations and dynamics of the digital resources they use (Krumsvik, 2014), they become more ready to modify them in a manner that serves all student learning needs. The objective is to appropriate teaching and learning practices by avoiding discovered earlier frictions or tensions in

mediated action (Krumsvik, 2014) that could disrupt digital *equity-digital readiness* work. To do so educators need not only to be ready to design appropriate digital learning environments and digital content, but also to guide students in doing the same work according to *Mayer's principles* (Mayer, 2005: 2017). According to Vanfleteren, Elen & Charlier (2022) such principles are:

- i. the *coherence principle* (avoiding any interesting, but unnecessary information),
- ii. the *redundancy principle* (presenting information with narration and graphics is more effective than text, narration and graphics),
- iii. the *segmenting principle* (brief and specific presentation of information so that students have control of their learning process, understand new information and continue),
- iv. the *modality principle* (presenting the information with oral narration and graphics rather than written text and graphics so as not to overload the visual information processing channel),
- v. the *voice principle* (human voice over narration increases social interaction and enhances the learning process), and
- vi. the *embodiment principle* (learning process is enhanced when there is an agent, who models new knowledge).

Finally, at a higher level of building digital competences educators invest in advancing their own and their students' *transformative digital agency* (Gudmundsdottir & Hatlevik, 2018) by taking into account modern digital technology breakthroughs, whether they concern civic life, AI and scientific research ethics or ideology (Aagaard & Lund, 2020). Herein, the objectives are to advance *innovative digital learning strategies* while performing research analysis on a challenging task (Galanaki & Katsarou, 2023) and to produce innovative *digital readiness-digital equity* learning outcomes.

5. Workshop digital toolkit for advancing digital equity and digital readiness

In order to support educators to handle the challenges of the digital reality they face, but also to overcome digital poverty as much as possible, we suggest the use of certain digital tools in a pedagogical context. The workshop digital toolkit that has been created is intended to support educators and their students in their *digital equity-digital readiness* work.

The workshop toolkit that we suggest is based on the PICRAT model (Kimmons, Graham & West, 2020) (see table 1.), as well as on its recent adaptations in the context of HE (Galanaki, 2023; Galanaki & Katsarou, 2023). It is, however, a new *digital equity-digital readiness* toolkit designed, not to simply list resources, but to encourage reflection and inform digital teaching and learning practices (Ivus, Quan, Snider, 2021: 46) relevant to different agency responses to digital technology (RAT: Replacement, Amplification, Transformation of traditional teaching practices) and different agency roles in digital teaching and learning practice (PIC: Passive, Interactive, Creative student's relationship to digital technology) (Kimmons, Graham & West, 2020).

Table 1. The PICRAT matrix

C I P	STUDENTS' RELATIONSHIP TO TECH IS _____	TEACHER'S USE OF TECH _____ TRADITIONAL PRACTICE		
		REPLACES	AMPLIFIES	TRANSFORMS
		R	A	T
C	CREATIVE	CR	CA	CT
I	INTERACTIVE	IR	IA	IT
P	PASSIVE	PR	PA	PT

From Kimmons, Graham & West (2020).

All resources presented in the toolkit matrix are meant to be aligned to the five *digital readiness strategies* of teaching in digital learning environments in order to reach the best possible learning outcomes (Gaki, 2023). Such strategies involve: i. *scaffolding* students' intake in digital learning environments (Doo, Bonk, & Heo, 2020; Kramarski & Michalsky, 2013) to develop metacognitive strategies, reduce the cognitive load and lead to positive learning outcomes, ii. supporting students' dynamic *social interaction* and a sense of "belonging" to a learning community (Arasaratnam-Smith & Northcote, 2017; Erdoğan, Çakır, & Korkmaz, 2022), iii. advancing *collaborative learning* in digital environments (Leu, Kinzer, Coiro, Castek, & Henry, 2017), iv. creating *inquiry learning communities* where students are required to search for and construct new knowledge by themselves through continuous interaction in order to solve authentic daily life problems (Aidoo, Anthony-Krueger, Gyampoh, Tsyawo, & Quansah, 2022; Aktı -Aslan & Turgut, 2021), v. implementing *assessment* (diagnostic, summative, evaluative and formative) (Sudakova, Savina, Masalimova, Mikhaylovsky, Karandeeva, & Zhdanov, 2022; Yılmaz & Toker, 2022).

Table 2. Digital readiness-digital equity toolkit

Educator	Replacement	Amplification	Transformation
Student			
Passive	The educator introduces to students the adopted digital content/digital tools/digital practices with digital readiness-digital equity features	The educator adjusts to student learning needs digital content/digital tools/digital practices to have digital readiness-digital equity features	The educator creates for students digital content/digital practices with digital readiness-digital equity features
Examples	<p>Web search methods & techniques</p> <ul style="list-style-type: none"> • Google advanced search operators • Google image search • Measuring a journals impact 	<p>Europeana pro learning scenarios</p> <ul style="list-style-type: none"> • Making Higher Education More Inclusive • Subtitle it • Digital learning in the pandemic - cultural heritage resources by and for educators 	<p>Instruction screen recorders & video streaming software</p> <ul style="list-style-type: none"> • CamStudio • Loom • Ezvid • Camtasia • OBS Studio
	<p>Open access repositories</p> <ul style="list-style-type: none"> • PhET • Veritasium • The Organic Chemistry Tutor • MIT OpenCourseWare • National (Greek) Documentation Center (EKT) • CLARIN's Virtual Language Observatory 	<p>Tools for advancing digital accessibility</p> <ul style="list-style-type: none"> • Vocaroo online voice recorder • Kapwing & veed.io Subtitling and captioning tools • ttsfree.com text to speech tool • typingguru.net voice typing & translation tool • MathType LaTeX or MathML editor <p>Digital accessibility checking tools</p> <ul style="list-style-type: none"> • Ally accessibility check for text colour on background image • Colorblindly • Web Accessible Colors 	<p>Mind map tools</p> <ul style="list-style-type: none"> • Lucidchart • MindMeister • Checklist • Google Mind Maps <p>EBook creation tools</p> <ul style="list-style-type: none"> • Canva • Marq

<p>Interactive</p> <p>Examples</p>	<p>The educator introduces to students interactive digital content/digital tools/digital practices with digital readiness-digital equity features and engages students to use them during course</p> <p>Ready to use Europeana pro learning activities & activity builders in language of choice</p> <ul style="list-style-type: none"> • Historiana • Europeana classroom <p>Podcast production & editing with text to speech & speech to text tools</p> <ul style="list-style-type: none"> • Descript <p>Podcast production with Q&A and Poll tools</p> <ul style="list-style-type: none"> • Spotify for Podcasters 	<p>The educator adjusts existing digital content/digital practices to have digital readiness-digital equity features to engage students during course</p> <p>Interactive presentations Portfolios, flashcards, quizzes, evaluation rubrics, sequence mazes, escape games with digital accessibility features</p> <ul style="list-style-type: none"> • Genially <p>Mobile Learning Management System</p> <ul style="list-style-type: none"> • EdApp 	<p>The educator creates original interactive digital content// digital practices with digital readiness-digital equity features to engage students during course</p> <p>Interactive assessment, 360° image, VR content creation tools</p> <ul style="list-style-type: none"> • ThingLink • Classtime • Lucidchart
<p>Creative</p> <p>Examples</p>	<p>The educator introduces & practices on interactive digital content/digital tools/digital practices with digital readiness-digital equity characteristics in order for the students to create new content in the context of a demanding assessment activity</p> <p>Literature review tools</p> <ul style="list-style-type: none"> • Research Rabbit • Elicit • PubMed • Connected Papers <p>Text to image tools</p> <ul style="list-style-type: none"> • Wepik • DALL-E 2 • Adobe Firefly <p>Information list & code writing for diagramming & charting</p> <ul style="list-style-type: none"> • CHATGPT3.5 & Mermaid Live Editor 	<p>The educator adjusts & practices on interactive digital content/digital tools/digital practices with digital readiness-digital equity characteristics in order for the students to create new content in the context of a demanding assessment activity</p> <p>Text to image tool with image reference affordance</p> <ul style="list-style-type: none"> • Dream by WOMBO <p>Gen-1 & Gen-2 video to video, text/image to video, image to image tools</p> <ul style="list-style-type: none"> • Runway <p>Collaborative video annotation</p> <ul style="list-style-type: none"> • Voicethread 	<p>The educator creates & practices on interactive digital content/digital tools/digital practices with digital readiness-digital equity characteristics in order for the students to create new content in the context of a demanding assessment activity</p> <p>VR environment creation</p> <ul style="list-style-type: none"> • Tilt Brush <p>3-D modeling, virtual world creation & coding tools for storytelling, simulations, games</p> <ul style="list-style-type: none"> • CoSpaces

Adapted from Kimmons, Graham & West (2020); Galanaki (2023); Gaki (2023).

Tools were selected based on their availability (free, free trial period), usability (accessible, readable, scaffolded instructions) and educational value (collaboration, interaction, multimodal presentation affordances). All of them can be used by educators and students of HE to adopt, adapt, appropriate and advance innovative teaching and learning practices. Such practices can enrich the dialogue on *digital equity-digital readiness* interrelation.

6. Conclusion, Discussion

In this paper, we have attempted to approach and understand the dialogue between the concepts of *digital equity* and *digital readiness* in the field of HE. These two concepts, although they are known for decades, came to the fore in recent years, especially after the Covid 19 pandemic, provoking a dynamic research dialogue. In this context the goal of this workshop is on the one hand to explore the dialogic relationship between the two concepts and on the other hand to provide a digital toolkit that can inform discussions on the topic. Main discussion points are expected to focus on self-reflection results based on the *Digital competence building model in HE* and on teaching proposals based on the proposed *Digital readiness-digital equity toolkit*. Furthermore, we expect the above teaching proposals to promote participant dialogue concerning modern dilemmas like creativity, advanced production or forgery and free tools or more sustainable paid solutions linked to HE curriculum reform and digital transformation.

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Afterword

‘Education is not the filling of a pot but the lighting of a fire’. W.B. Yeats