

ECOLHE IO5 FINAL REPORT

DiTES



UNIVERSITY OF
PATRAS
ΠΑΝΕΠΙΣΤΗΜΙΟ ΠΑΤΡΩΝ



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TABLE OF CONTENTS

1.INTRODUCTION	3	2.2.4 Resources for teaching and learning	14
2.SUGGESTIONS FOR ACADEMIC BODIES	3	2.2.5 Student's active role, teachers' role as a guide and planning	14
2.1 Digital transformation of HEI	3	2.2.6 Stable learning environment, and well bounded tools.....	15
2.1.1 Digital innovation impact	4	2.2.7 Suggestions for online training models use in HE	15
2.1.2 Digital innovation strategies	5	2.3 GAMIFICATION AS A STRATEGY TO INCREASE STUDENT ENGAGEMENT IN HE – TEACHERS' PERSPECTIVE	15
2.1.3 Digital learning process.....	5	2.3.1 Advantages and disadvantages of gamification in HE	15
2.1.4 HE institution digital innovation	6	2.3.2 Suggestions for the adoption of Gamification in HE	16
2.1.5 Pandemic's impact on the teaching-learning experience.....	6	2.4 THE SYMBIOTIC LEARNING PARADIGM (SLP) IN HIGHER EDUCATION	18
2.1.6 International Quality Standards.	7	2.5 DIGITAL TRANSFORMATION AND DIGITAL PEDAGOGY QUALITY OF LEARNING AND TEACHING IN HE	19
2.2 DIGITAL TECHNOLOGIES IN HEI – STUDENTS PERSPECTIVE	8	3. CONCLUSION	20
2.2.1 Self-realization Focused.....	9	REFERENCES	23
2.2.2 Social.....	9		
2.2.3 Teacher Centred	10		
2.3.4 Job focused	10		
2.2.5 Lone Riders	11		
2.2.6 Task-oriented.....	12		
2.2.7 Analogically Tuned	12		
2.2 ONLINE TRAINING MODEL FOR IMPROVING TEACHERS IN HE.....	13		
2.2.1 Competences and continuous assessment	13		
2.2.2 Active and collaborative methodologies and wide typology of e- activities.....	14		
2.2.3 Asynchronous and synchronous communication	14		

LIST OF FIGURES

FIGURE 1: E-LEARN CENTER EVALUATION AND ADJUSTMENT PROCEDURE.	6
FIGURE 2: RADAR CHART OF SELF-REALIZATION FOCUSED STUDENTS [4].	9
FIGURE 3: RADAR CHART OF SOCIAL [4].	9
FIGURE 4: RADAR CHART OF TEACHER CENTRED STUDENTS [4].	10
FIGURE 5: RADAR CHART OF JOB FOCUSED STUDENTS [4].	11
FIGURE 6: RADAR CHART OF LONE RIDERS [4].	11
FIGURE 7: RADAR CHART OF TASK-ORIENTED STUDENTS [4].	12
FIGURE 8: RADAR CHART OF ANALOGICALLY TUNED STUDENTS [4].	12
FIGURE 9: ADVANTAGES OF GAMIFICATION [6].	16

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FIGURE 10: DISADVANTAGES OF GAMIFICATION [6].

16

1. INTRODUCTION

Digital transformation in Higher Education (HE) is a major priority for the European Union (EU) and in the years to come there will be a reconstruction of the Higher Education Institutions (HEI) at all levels of their operation. With the adoption of the Digital Education Action Plan (2021-2027) on 30 September 2020, the EU sets the target of a high-quality, accessible and inclusive digital education supporting the Member States for their entry into a digital era.

A pioneer of these radical changes is the ECOLHE project which through its research tries to contribute in enhancing and promoting e-learning with high-quality standards. For that purpose, during the past three years extensive work took place which led to five high-quality Intellectual Outputs (IOs) summarised in this report. In specific, IO1 analyze six case studies in partner countries focusing on how Universities develop their strategic approaches to digitalization. In IO2, online training was implemented to empower teachers and researchers' skills in online and blended learning, aiming to the qualitative dimensions of human interaction. In IO3 new online environments and the gamification logic implementation in HE were examined followed by the introduction of the Symbiotic Learning Paradigm (SLP) in course design in IO4. From all that extensive work useful outcomes were extracted, which will be presented in the following sections of the final IO5: Recommendations and Guidelines for Academic Bodies.

These recommendations and guidelines are formed in consistency with all previous ECOLHE IOs and European directives with the ambition to form

a useful guide for the Academic Bodies in their way to the digital transformation of their services.

2. SUGGESTIONS FOR ACADEMIC BODIES

2.1 Digital transformation of HEI

Giulia CECCHINI, Emanuela PROIETTI

Università degli Studi Roma Tre

Stefania Capogna, Maria Chiara De Angelis, Francesca Greco,

Flaminia Musella, Brunella Botte, Giada Marinensi

Link Campus University

As mentioned in [1] the central goals of Digital Transformation (DT) in HEIs that emerge are related to improving infrastructure, business process, administration, teaching, curricula, job, access, market openness, research, and digital marketing. Novel aspects to consider are the technology that stands out our work management systems, business frameworks, digital technology, computers, and software.

The comparative analysis of national reports extracts six development topics (clusters).

1. Digital innovation impact.
2. Digital innovation strategies.
3. Digital learning process.
4. HE institution digital innovation.
5. Pandemic's impact on the teaching-learning experience.
6. International Quality Standards.

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2.1.1 Digital innovation impact

According to ECOLHE findings of [2], digital innovation impact shows how digital innovation affects people, taking into consideration the structure available at university and the way people deal with this kind of technology in terms of practices, supports, and resources occurred. Factors which increase digital impact are good infrastructure, technical and pedagogical support and a widespread culture of sharing are drivers of digital innovation. On the other hand, lack of time, teachers', researchers and administrative staff digital skills and the recognition of the value of work in a digital environment represent the main obstacles to digital innovation in Higher Education. Considering these factors, HEIs should target to increase the positive factors and limit the negative ones.

Digital infrastructures should be the priority for HEIs in their way to digitalisation. One of the guiding principles of EUs' Digital Education Action Plan (2021-2027) [3] refers to: *"Appropriate investment in connectivity, equipment and organisational capacity and skills should ensure that everybody has access to digital education"*. That means HEIs should be able to provide network connectivity to training, administrative staff and students, and the equipment and network capacity to perform their scope and goals. That translates in development of institutes network capacity and speed via network upgrade were necessary and enhance network support administrative services. HEIs network should be reliable, fast and able to support thousands of users during the academic year. Of course, technical staff should be well prepared to deal with any malfunction which should be repaired in a very short time.

That leads to the second factor which is technical and pedagogical support. Technicians are the cornerstones for HEIs facilities function. Thus, must

be experienced and well trained and for that reason, HEIs should provide them, regular training seminars in order to keep them up to date with the latest technology features. A number of technicians also should not be neglected. HEIs should be able to hire the necessary number of technicians according to institute needs. For that purpose, an essential factor is institutes funding.

Pedagogical support is also very important because professors and tutors must be up to date and beyond with the latest teaching tools and methods. For that reason, seminars and teacher training should be organised regularly from HEIs, and exchange of best practices with other HEIs of the same country and abroad. Exchange of good practices is the best way to foster methods that have already tested and worked in other institutes. Of course, any new methods should be adjusted with native culture and legislation.

For the increment of the digital innovation impact the drawback factors should be limited to a minimum. Lack of time is one of them. There should be enough time for HEI staff to fulfil their scope and also through a good made scheduling to be able to be informed through the training seminars mentioned before. Teachers' digital skills should be upgraded. Many teachers follow a teaching method from the beginning of their career and do not activate a reflective practice on it over the years. Reasons are different. Polytechnic schools' teachers, for example, are more equipped with digital skills because it is mandatory from the nature of their work. Teaching staff of other schools' digital skills become less important compared with the main need to be constantly up-to-date in their own discipline. Offering opportunities for didactics updating, as well as spaces for sharing teaching practices, can be very useful.

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2.1.2 Digital innovation strategies

Digital innovation strategies focus mostly on the meso level and they differ from country to country according to their national policies and strategies which reflect their perspective in digital development. There are differences among public and collective institutions, accreditation systems in each country, and technology providers. According to ECOLHE findings, some of the partner countries with the highest Digital Economy and Society Index (DESI) are ahead from others. Still, during the COVID-19 years, all HEIs faced difficulties caused to the rapid transformation from face-to-face learning to online. Common ground in all universities was the organisational problems that they faced during their fully online operation.

Finland and Ireland have the advantage in vision to promote digital development of their HEIs. Finland emphasizes on the independence and disciplined self-management skills of students and teachers, as the key elements for the success of HEIs' digitalisation, rather than the development of a national strategy. In Ireland, the Department of Further and Higher Education, Research, Innovation and Science respect the autonomous nature of HEIs but suggests departments and institutions be aware of existing policies and have agency in how they are implemented in the various academic contexts.

From ECOLHE findings resulting that HEIs should follow the good practices of advanced countries, customised in a coherent legislative framework according to their national policies. They should be focused on improving:

- digital skills of the Academic Community (both in teaching and administrative staff);

- the formation of digital teaching and learning policies to support high-quality education;
- the promotion of new teaching methods, which empower students' digital skills;
- the independence and discipline self-management skills of students and teachers.

2.1.3 Digital learning process

Digital learning process mainly focuses on people interaction. In specific, presents how teachers and students face the process of teaching and learning online. ECOLHE research reveals that countries below the DESI (Italy and Greece) seem to pay more attention to the digital learning process. For the improvement of that factor, HEIs should:

- create conditions for digital development;
- ensure the availability of face-to-face lessons and online using blended methods;
- promote asynchronous methods of teaching and learning;
- create high-quality standards that ensure the high level of knowledge which must be provided;
- improve students' digital skills through well-designed courses;
- improve teachers' digital methods with the introduction of new ways of teaching;
- design pilot digital courses using innovative tools like Symbiotic Learning Paradigm (SLP);

- design and implement quality tools which will ensure an immutable examination process;
- ensure monitoring, validation and evaluation of the teaching and learning process;
- make online courses more appealing and easier to attend;
- introduce and empower technical tutors;
- provide knowledge and tools to tutors to support and monitor students' progress.

2.1.4 HE institution digital innovation

HEIs digital innovation translates into how Academic Bodies realise their national policies on digital transformation in HE. According to ECOLHE findings [2]: *“The Senate of the University, consisting of representatives of the entire academic community, is the highest policy-making collective body of the University setting the overall policies. The Rector convenes the Senate, chairs its meetings, sets the agenda, and represents the University at the highest level. The Rector’s Council is the highest executive body.”* Digital innovation is an important issue in countries which are below DESI such as Greece and Italy, while in countries with high DESI, such as Spain, Finland and Ireland. Notice, unlike other countries, that Spain’s university is fully online, so good practices from its operation should be implemented from other HEIs with the scope to increase their digital innovation factor.

General guidelines should be followed:

- creation of e-Learn centre which will translate institutionally the innovating experiences emerging from the research;

- e-Learn Center will monitor and evaluate the implementation of digital methods and adjust it, if necessary, to achieve optimum results;
- adoption of these methods by a teacher or a group of professors;
- creation of a continuous, closed-loop feedback procedure which the new digital product will implement, evaluated, corrected and implemented again (fig.1).

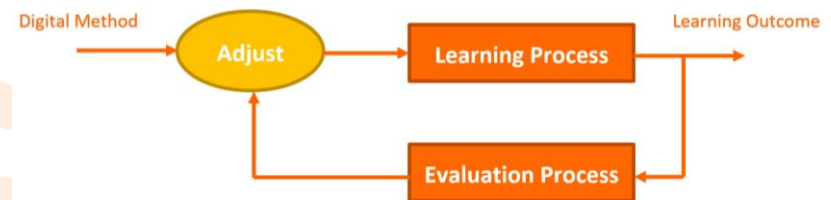


Figure 1: e-Learn Center evaluation and adjustment procedure.

After optimising the learning outcome, the new digital method will be able to join a curriculum. Attention should be given to the way of evaluation and qualification. Any new digital method that will be implemented should follow the coherent quality standards of each HEI and country legislation standards.

2.1.5 Pandemic's impact on the teaching-learning experience

The pandemic was a landmark for the procedure of digitalisation in HE. In a very short period, force traditional face-to-face institutions to work remotely in both teaching-learning and administrative processes. In HEIs digital innovation was not yet fully intergraded faced at the beginning some

challenges to adapt a remote way in their operation. But during the pandemic, a lot of very useful outcomes were extracted about vulnerable points of remote operation. It reveals that before the integration of any digital development institutes should have a specific digital plan and the infrastructure to support it. To be more specific:

- they should pay attention to their network capacity and speed to cope with high-demand operation conditions. At the beginning of the pandemic, network operation was problematic, it was not designed to support the large number of students and staff;
- learning platforms are another factor that should pay attention to. During remote lessons a lot of different video conferences platforms were used, and according to the users perspective some of them were better than others. A very careful selection of the e-learning platform is essential;
- one learning platform should be used globally for all HEIs procedures. Using different platforms will lead to confusion because in that way users should have to learn and work in different interfaces;
- properly design of teaching-learning procedures for use in remote environment. Remote lessons have a different approach and need in comparison with face-to-face ones. It is not a good practice to copy a traditional teaching method to a digital environment because pandemic reveal that it will become very hard for teachers to teach on a screen for approximately three hours and for students to be focused. SLP will be a very useful guide with a proper design;

- digital tools and gamification methods integration in teaching-learning procedures to attract students' attention and enhance learning outcomes;
- proper design of examination and evaluation procedures aiming to reduce cheating and plagiarism.

All the above actions, as pandemic years reveal, will lead to a better remote way of teaching and learning. Some of these actions were used in the late days of the pandemic lockdown and the results were very encouraging.

2.1.6 International Quality Standards.

Quality standards are adopted at the national level and quality assurance is built by academic institutions at the local level. Each institution sets its own parameters concerning the outcomes of its operation. Quality of studies and administrative procedures consists the major factor of HEIs reputation. A good practice that is used in most of HEIs is a central Quality Assurance Unit (QAU) which has the responsibility for the coordination and support of the whole process of the institutions' quality assurance system. HEIs should pay extra attention in the introduction of new standards referring to digital environments' qualifications. They should focus to:

- ensure that studies will have the same or even better results for their graduates;
- examination procedures in digital environments will be immutable and fair for all the participants;
- digital transformation will not reduce institutes' reputation;
- digital teaching will not lead to a degree downgrade;

- digital administration will perform as good as traditional and, in many cases, even better.

To achieve all the above first an open dialogue with all key players within the institutions should be held to define down limits of quality which should remain. Second it is proposed a complementary committee to be formed in every institution with the scope of continues monitoring and evaluating digital procedures and outcomes. It is suggested a representative from all actors to participate in the formation of the committee, professors, tutors, administrative staff and why not students. An external evaluator's opinion it is also necessary and will be encouraged with the purpose of a clear point of view evaluation.

It is suggested also the formation of a QA point system which will take into consideration:

- administrative operation and performance;
- teaching procedures;
- teaching staff performance;
- students' learning experience;
- students' learning outcomes;
- students' performance;
- graduates' employability;
- connection of learning outcomes with market needs.

2.2 DIGITAL TECHNOLOGIES IN HEI – STUDENTS PERSPECTIVE

ECOLHE field research survey [4] presented in chapter 3 involved 1148 students from Spain, Italy, Greece, Finland and Ireland universities. During the survey, students were called to answer a carefully designed questionnaire which was aiming to explore the following sections: teaching innovation, students' achievement, and students' experience.

ECOLHE survey analysis reveals five latent factors that characterize students' digital maturity: *Digital Tuning*; *Teaching Innovativeness*; *Soft Skills*; *Employability*; *Positive Relationships*. According to these factors students classified into seven clusters: *Self-realization Focused* (26,7%); *Social* (19,6%); *Teacher Centred* (15,6%); *Job focused* (14,1%); *Lone Riders* (10,2%); *Task-oriented* (8,9%); *Analogically Tuned* (4,9%). Inside the parentheses are the percentages of the sample. Some general suggestions are:

- a periodic survey to be held internally in every department that HEI has, exploring the digital maturity of students in each department, teaching and administrative staff;
- using the results from each department a general digital maturity outcome will be extracted for the whole institution;
- determine an institutional digital mature factor which will be a quantitative quality variable that every HEI will try to optimise.

The following sections present the ECOLHE field research analysis followed by suggestions for the improvement of each student group separately. The whole survey analysis in detail is presented in [4].

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2.2.1 Self-realization Focused

It is the largest group of students (26,7%) and they are interested in all the aspects highlighted by latent factors. We can assume that they are digital tuned (fig. 2) [4].



Figure 2: Radar chart of Self-realization Focused Students [4].

It is suggested to HEIs open a real dialogue together with students. Students' perspectives should not be neglected for the digitalisation of institutions. ECOLHE survey analysis reveals that a countable number of them are mature enough to enter a digital learning environment. Students' feedback is an important factor even in the traditional way of operation. Young people always have an open mind and new ideas usually pointing to the future.

For that purpose, it is proposed:

- the organisation of workshops and conferences is proposed with the subject of the digitalisation of HEIs. Here the vision of EU digital

transformation in HE will be analysed in detail with respect to each institution's internal rules;

- internal HEIs surveys to explore students' current state in digitalisation;
- creation of digital learning environments and platforms;
- team working encouragement in digital learning environments with the scope high digital tuned students help the fewer ones.

2.2.2 Social

They represent 19.6% of the sample and are mostly interested in the relational activities surrounding education. They are centred on soft skills and positive relationships, and they do not focus on employability and care less about teacher innovativeness (fig.3) [4].

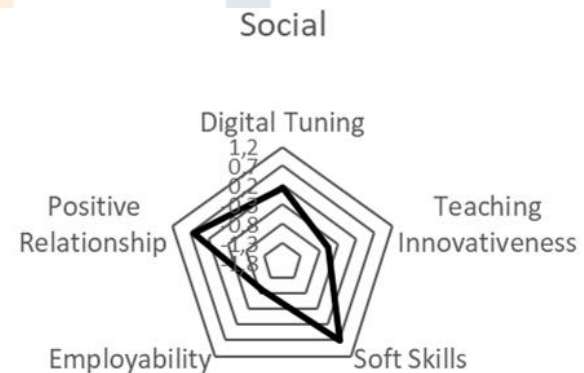


Figure 3: Radar Chart of Social [4].

Students' attention to Teaching Innovation and Employability should be needed. For this purpose, is suggested:

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- an open dialogue with market stakeholders;
- organisation of seminars for students' information about employability possibilities;
- organisation of workshops focusing on market needs;
- reformation of curricula enhancing new teaching tools;
- use of new teaching methods and tools in lectures;
- using new innovative methods in curriculum design (e.g. Symbiotic Learning Paradigm SLP).

- the organisation of seminars promoting career opportunities;
- reformation of curricula adding market needs orientation;
- promoting teamwork projects in class;
- use of asynchronous learning methods;
- encourage the use of digital tools in learning procedures.

2.2.3 Teacher Centred

Teacher Centred students (15.6%) do not care about peer relationship but focus mostly on teaching innovativeness rather than being digitally tuned (fig. 4) [4].

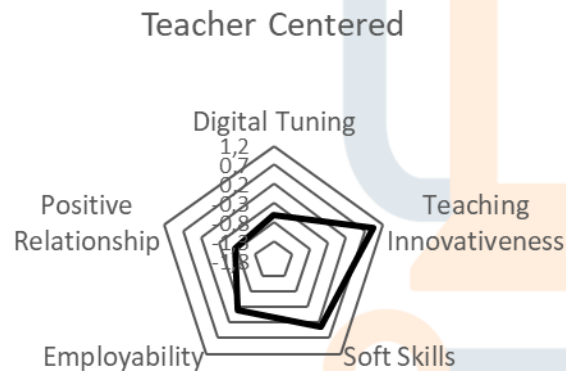


Figure 4: Radar Chart of Teacher Centred Students [4].

To advance to a higher digital maturity, it is suggested:

2.3.4 Job focused

That group of students represents 14.1% of the total sample. They are focused mostly on the employability and seems to be less interested in digital tuning (fig.5) [4]. That kind of students seem to be more practical than the others. It is possible that the majority of them come from institutions that digital maturity is not yet in a good level in their institution. As we read in [4]: “Digital Tuning seems to have a trend similar to digital maturity (Figure 4). The most tuned students are those from Spain and Ireland, two universities with a long experience in digital training, followed by the Italian digital university and the Finnish one. The traditional university’s Italian students are less digitally tuned, being however significantly more tuned than the Greeks. In fact, digital tuning seems to be related to their familiarity with the digital higher education environment.”

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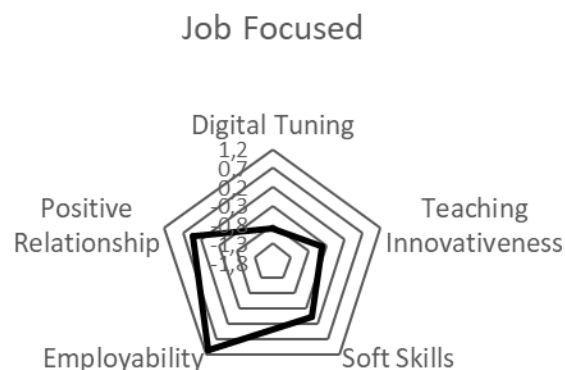


Figure 5: Radar Chart of Job Focused Students [4].

For the increment of Institutions digital maturity is proposed:

- reformation of the program courses fostering digital environments (e.g. extensive use of digital platforms);
- asynchronous methods of teaching and learning;
- use of online training models for teachers with the purpose to increase their online teaching capabilities;
- use of gamification teaching methods;
- fostering digital tools in teaching procedures;
- reforming lecture presentations;
- encouraging online teamwork projects;
- connection of digital methods use in learning with job opportunities and graduates career.

2.2.5 Lone Riders

Lone Riders represent the 10.2% of the sample, and It is the reverse of teacher-oriented one. Both groups don't focus on peer's relationship, but these students are highly digitally tuned and don't care about teacher innovativeness (fig.6) [4].

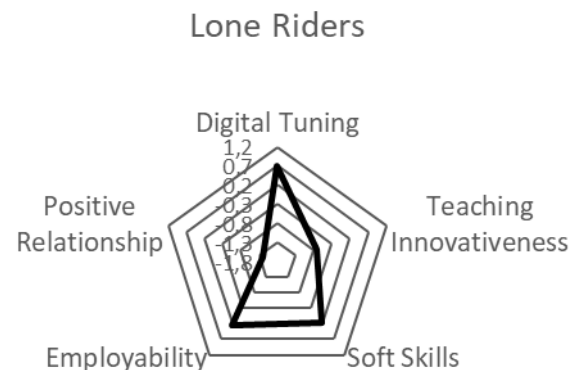


Figure 6: Radar Chart of Lone Riders [4].

Positive Relationship and Teaching Innovativeness should be increased. It is suggested to:

- promote an open dialog among students in class;
- Use of online training models to increase teachers' digital capacity;
- peer to peer projects assignment;
- use of gamification teaching methods;
- use of digital tools in teaching;
- redesign courses using new models and formation;
- promote teamwork projects.

2.2.6 Task-oriented

Task-oriented students (8.9%) are interested on average to all the digital components but the soft skills. They seem to be practical and effective not really caring to relational effectiveness (fig.7) [4].

Soft skills and employability interest should be increased through:

- project assignment and presentations;
- connection of teaching process with career opportunities;
- organisation of workshops according to graduates' career needs;
- organisation of seminars and presentations from market stakeholders;
- connection of soft skills enhancement with career development;

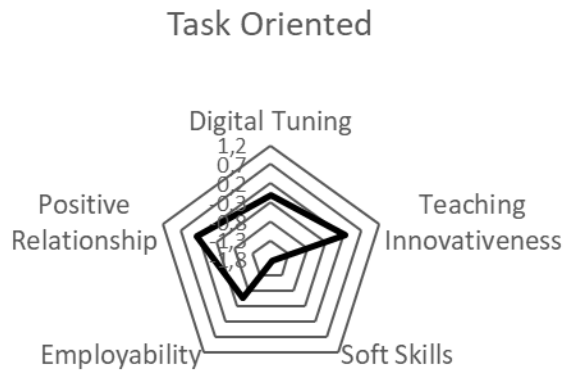


Figure 7: Radar Chart of Task-Oriented Students [4].

2.2.7 Analogically Tuned

Consists of a small group of 56 students (4.9%) mostly interested in the employability factor. They seem to prefer face-to-face training instead of a digital-based one. This is reflected in their lack of interest in digital factors.

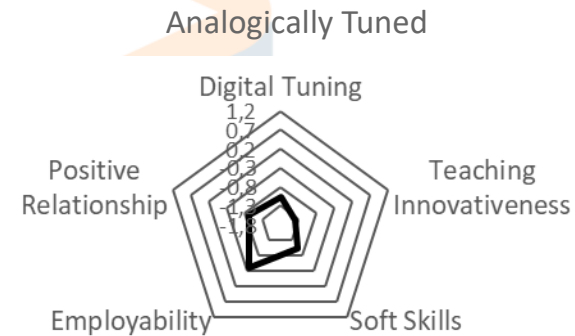


Figure 8: Radar Chart of Analogically Tuned Students [4].

For the improvement of digital maturity of that group all the above methods should be used taking into consideration the institution coordination and internal rules.

2.3 ONLINE TRAINING MODEL FOR IMPROVING TEACHERS IN HE

Montse Guitert, Teresa Romeu, Marc Romero, Pablo Baztán
Universitat Oberta de Catalunya (UOC)

The proposed training, designed by teachers and researchers from the Open University of Catalonia is developed in the framework of the European project Empower Competences for Onlife Learning in HE (ECOLHE). Implemented in 6 countries around Europe: Italy, Spain, Ireland, Greece, Cyprus and Finland. Open University of Catalonia (UOC) with more than 25 years' experience in online education defines ten key components of online teaching and learning which are presented in more detail in [5]:

1. student's active role;
2. competences;
3. active and collaborative methodologies;
4. wide typology of e-activities;
5. asynchronous and synchronous communication;
6. resources for teaching and learning;
7. continuous assessment;
8. teachers' role as a guide;
9. planning;
10. stable learning environment and well-bounded tools.

UOC team uses these ten key components in an integrated way and designs a pilot training course for European HE teachers.

During the pilot, participants were involved not only in receiving theoretical training on online teaching but also designing, implementing and evaluating their own online activities. The training participants have an active role and will work collaboratively in teams, playing teachers' and students' roles in different phases of the training. Regarding its planning, the training pilot was structured into different activities, two synchronous and four asynchronous, with a total workload of 30 hours.

The suggestions of [5] are based on the results of the pilot course implementation and focus on key components improvement.

2.3.1 Competences and continuous assessment

Participants without online teaching experience and/or collaborative work experience, faced difficulties during the training due to their lack of knowledge in both competences. It is suggested that:

- previous knowledge on these key competences should be ensured before participants enroll in a training based on online and collaborative work.

Participants misunderstood the rubrics provided to evaluate the achievement of competences. It is proposed that:

- clarification about the competences development in the training;
- instruments to perform evaluation should be created.

2.3.2 Active and collaborative methodologies and wide typology of e-activities

For those participants without experience in collaborative work, the coordination between other group members at the beginning was a big challenge. When this initial difficulty is overcome, training becomes a great opportunity to achieve new learning outcomes because collaborative work offers the opportunity to learn from other colleagues' experiences. It is also important that activities the participants have already created or use in their day-to-day courses can be integrated or adapted [5].

For participants' collaboration and formation of e-activities, it is suggested that:

- an introductory course should be organised promoting best practices in collaborative work;
- adaptation of activities that participants use in their day-to-day courses;
- transformation of face-to-face activities into online activities.

2.3.3 Asynchronous and synchronous communication

To promote asynchronous and synchronous communication in online training models taking ECOLHE pilot training outcomes as an example, HEI should:

- before the adoption of the training, more confidence and understanding of asynchronous communication performance should be generated. (e.g., through focused workshops);

- the introduction of asynchronous communication in online training should be implemented in a gradual way. It is better if there is previous specific training in asynchronous communication;
- incorporation in the planification of the training with some synchronous sessions to check if there are any aspects to improve or clarify.

2.3.4 Resources for teaching and learning

Considering the resources of the ECOLHE training pilot course it is proposed that:

- material should be presented in different levels of depth and that should be highlighted in the training material presentation;
- material should not be very extensive but adequate to cover trainees' needs;
- extra material can be provided for further reading but should be separated from the mandatory;
- videos can also be used to explain parts of the training.

2.3.5 Student's active role, teachers' role as a guide and planning

Training requires an active role from the participants. For that purpose, participants should be familiar with the online learning platform that will be used and not spend extra time learning it. That could be improved with the organisation of introductory courses where teachers will demonstrate online platform operation and solve any problems that will be revealed.

Teachers' role is essential and they should accompany students throughout the whole procedure. As remarked in [5]: *"The constant presence of the e-facilitators is essential. Logically, teachers without online*

teaching experience think that this is not the case in online teaching, because in traditional universities, teaching presence is associated with being face-to-face. Changing this conception and giving participants tools to accompany students virtually were also important objectives of the course.”

2.3.6 Stable learning environment, and well bounded tools

The environment of e-learning should be familiar to participants (teachers and learners) for that purpose it is appropriate to offer a pre-training to the participants in order to offer all the background necessary to go deep in online teaching-learning.

2.3.7 Suggestions for online training models use in HE

Taking into consideration all the above sections, some general suggestions about the use of online training models are [5]:

- ensure previous knowledge on some competences before participants enrol in online training. Collaborative work and asynchronous communication are two key competences to ensure success in online training, and both require the active role of the participants;
- knowledge of the platform where the course will be followed and its accessibility for teachers and learners. Therefore, a pre-training for the participants, and another one addressed to the e-facilitators to offer all the background necessary to go deep in online teaching-learning;
- regardless of the tasks that each course activity proposes, it is also important that activities that the participants have already created

or that they are using in their day-to-day courses can be integrated or adapted;

incorporate in the planification of the training some synchronous sessions to check for any aspects to improve or clarify.

2.4 GAMIFICATION AS A STRATEGY TO INCREASE STUDENT ENGAGEMENT IN HE – TEACHERS’ PERSPECTIVE

Giada Marinensi, Matilde di Lallo, Brunella Botte

Link Campus University (LCU)

That part [6] of ECOLHE project investigates the use of educational gamification tools in HE, which can be defined as the use of game elements and game design techniques in educational contexts. Exploring teachers’ attitudes towards gamification is extremely relevant for any HEI interested in implementing it in order to understand which are the more relevant drivers and barriers to its adoption and to implement adequate measures and strategies to support teachers in their effort to effectively integrate game elements into their courses. During the Pilot Training carried out as part of the ECOLHE project, participants were presented with a survey including a list of possible benefits of Gamification to rate, as well as the opportunity to add their own.

2.4.1 Advantages and disadvantages of gamification in HE

ECOHE report [6] presents the advantages and disadvantages of gamification from teachers’ point of view. Figures 9 and 10 depict the responses from a list of advantages and disadvantages that were given to the participants. ECOLHE research team analyse the results and conclude

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with some very useful outcomes that will become a helpful tool for game element introduction in HEIs learning procedures.

According to [6] gamification:

- improves knowledge absorption and retention;
- foster motivation and engagement;
- provides immediate feedback to help students adapt to learning challenges;
- applies and practices learning within a meaningful and authentic context;
- places learners within systems where they can safely manipulate and explore functions;
- assists with the transfer of learning to real-world contexts and problems;
- promotes cooperation, teamwork, communities of learning and practice.

On the other hand:

- distracts learners from learning objectives;
- leads to overstimulation or game play addiction;
- replaces other learning activities such as hands-on experiments and simulations;
- does not meet the learning needs of all learners;
- blurs boundaries between virtual and reality;
- absorb teaching resources and is time-consuming for the teacher.

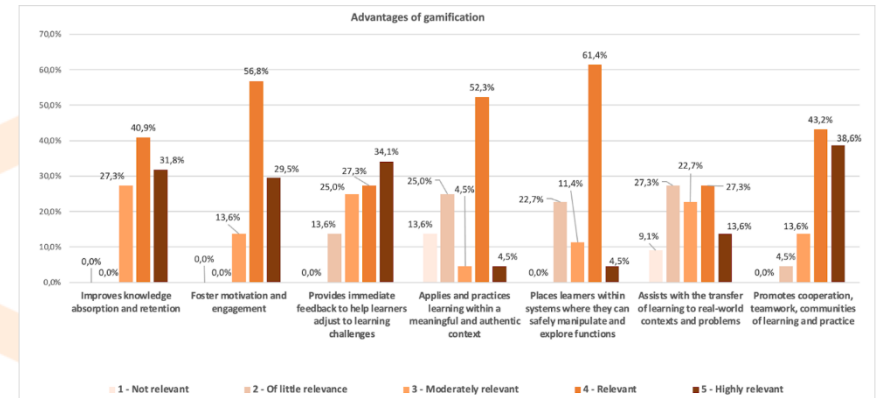


Figure 9: Advantages of Gamification [6].

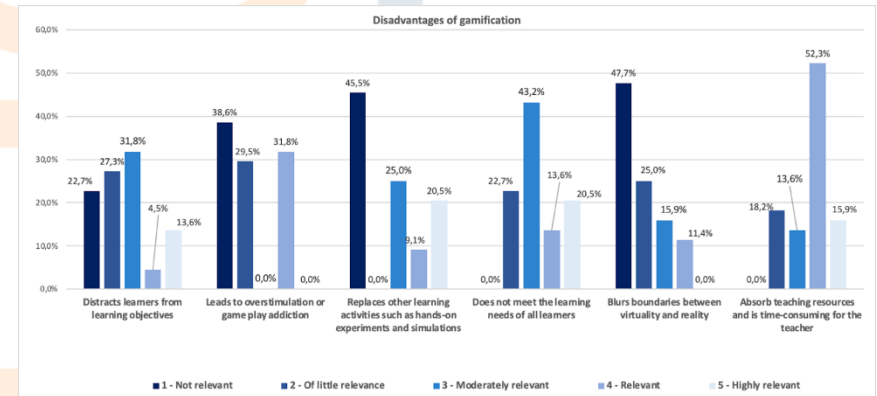


Figure 10: Disadvantages of Gamification [6].

2.4.2 Suggestions for the adoption of Gamification in HE

These suggestions [6], emerged from the ECOLHE pilot training participants who had the opportunity to use them in an online learning procedure in order to improve gamification use in HEIs.

1. Gamification absorbs teaching resources and is time-consuming for the teacher. Creating a good gamification activity is complex because it requires knowledge of the subject and a proper explanation of the pedagogical and technical aspects of Gamification. It is suggested:
 - the creation of an interdisciplinary approach or team;
 - good collaboration with teachers that already implemented Gamification in their classes. In this way, newcomers to Gamification would not have to start from scratch but have a good starting point on how it should be implemented and adapt it to their courses;
 - always be up to date with new tools, apps and resources that would be useful in a Gamified class;
 - use of more efficient use of plugins and software to create content in order to save time and solve the disadvantage;
 - allocation of the resources and create interdisciplinary collaborative working contexts with moderators. There are instructional designers who are experts, and this is their subject-matter area, so hiring them for teams that provide online and blended options would be vital for professional provision;
 - make some processes more automated and give teachers templates to refer to;
 - provide teachers with adequate documentation and support, especially during their first experience with Gamification.
2. Gamification disadvantage is that replaces other learning activities such as hands-on experiments and simulations. Focalsing education on practice could be useful to promote students' competences, so, working in a virtual learning system, and applying it on a daily basis, could be interesting. It is suggested:
 - the use of practical experiments for the development of the student in the professional activity that later they will develop and apply what they have learned;
 - include practical experiences in order, to transfer their theoretical learning to practice. It is important to ensure that gamification is not just a digital experience, it must also promote subject competencies.
3. Gamification's disadvantage is that blurs boundaries between virtuality and reality, and sometimes we believe that as we are in a game, there are no consequences. Mistakes are sometimes not just losing points but also have short and long-term consequences. It is suggested:
 - the clarification that gamification use should be a tool for continuous improvement but from the reality of everyday life;
 - gradually introduce into the teaching programmes and combine it with other tools.
4. Gamification has difficulty in adapting the gamified activity to different types of student motivations. It is suggested:
 - the use of a questionnaire at the beginning of the course to see the level of knowledge of the students and adapt

the difficulty of the game and keep them in mind in the design of the gamification;

- also, to be able to adapt to the needs of the students, additional learning resources can be offered that allow the student to reach the resolution of the gamified activity;
- evaluation of the gamified activities should be adapted to the needs of the students and could be based on an evaluation system for the improvement of their learning, considering the starting point and what they have accomplished when completing the game.

5. Gamification's disadvantage is that it does not meet the learning needs of all learners. It is suggested:

- provide alternative activities for students;
- teachers should use Gamification as students to learn how to improve and get help from other teachers;
- creation of content in different formats (audio, video and tactile), and give the students the chance to participate in some aspects of Gamification in anonymity and use scores in order to encourage participation.

6. Gamification may lead to overstimulation or gameplay addiction. This can be solved by

- eliminating the leaderboard or thinking about a different one;
- adding study units based on the mistakes the student makes. Structuring the question, the student got wrong in

a different way encourages reasoning rather than memorisation.

2.5 THE SYMBIOTIC LEARNING PARADIGM (SLP) IN HIGHER EDUCATION

Finola McCarthy and Séamus Ó Tuama

Centre for Adult Continuing Education (ACE), University College Cork (UCC), Ireland

ECOLHE project in its fourth step involved a pilot SLP use in co-designing a curriculum in all partners countries. SLP is a collaborative and learner-centred approach to curriculum design that aims to make explicit the dynamic and complex praxiological endeavour necessary to design lifelong and life-wide learning opportunities in higher education. SLP, as an approach to curriculum design, aims to bring the learner to the centre as a co-designer in the process, in collaboration with the teacher [6].

Pilot use of SLP in a curriculum design reveals that the central concepts are:

1. learner at the Centre;
2. lifelong and life-wide learning.

Furthermore, the eight elements of the approach are:

1. collaborative relationships;
2. tripartite stakeholders, learners, HEIs;
3. flexible, accessible and open;
4. reflective education;

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5. knowledge and skills adaptive;
6. transversal competencies;
7. reflexive education;
8. responsive to unpredictable futures.

The use of SLP is recommended in the curriculum design because put learners in the place of stakeholders in designing their own curricula.

Furthermore:

- provides a connection between HEIs and market needs;
- gives the participants the opportunity to contribute instead of listening to a monotonic presentation;
- generates new open collaborative relationships that bring the university processes out to the external world of the learners;
- making students part of the design process make courses more attractive to them, and that leads to the reduction in dropout course rate.

2.6 DIGITAL TRANSFORMATION AND DIGITAL PEDAGOGY QUALITY OF LEARNING AND TEACHING IN HE

Paresh Rathod, Pasi Kämppi

Laurea University, Finland

To move towards digital transformation HEIs should take into consideration the integration of Symbiotic Learning Systems. The goal is the improvement of quality in both teaching and learning procedures [8]. Symbiotic learning systems can be applied in HEIs with the goal of

improving the effectiveness and efficiency of learning and decision-making. The effective implementation of digital pedagogy along with symbiosis learning methods can significantly improve the quality of learning and teaching in the European HE Area.

- Digital transformation refers to the process of using technology to fundamentally change how an organisation operates and delivers values, and in the context of education, it refers to the integration of digital technology into the education system with the goal of improving the effectiveness and efficiency of teaching and learning.
- Digital pedagogy refers to using digital technology to enhance and transform teaching and learning practices, including symbiotic learning processes.
- Digital transformation and digital pedagogy work together to improve the quality of education and to better prepare students for the workforce and society.

Taking into consideration [8] policies recommendations regarding the digital transformation of HEIs are:

1. the development of European and national standards for digital literacy: This will ensure that students are prepared for the digital world and have the necessary skills to succeed in an increasingly digital workforce;
2. higher management support and policy development: Prepare and awareness of the higher management to take decisions that support the digital transformation, including policies, processes and resources;

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3. increase funding for technology infrastructure and teacher training: This will ensure that schools have the necessary equipment and resources to support digital learning and that teachers are equipped to effectively use technology in the classroom;
4. promote the use of open educational resources: This will allow schools to access high-quality digital learning materials at little or no cost, and can help to reduce the cost of education;
5. provide professional development opportunities for teachers: This will ensure that teachers are equipped to effectively use technology in the classroom and stay up-to-date with the latest digital tools and resources;
6. encourage the use of Artificial Intelligence and technological solutions: This will allow schools to track student progress and make data-driven decisions to improve student outcomes;
7. emphasize the importance of cyber security and digital safety: Make sure that students, teachers and school staff are aware of the risks associated with digital technologies, and that appropriate measures are in place to protect against cyber-attacks and data breaches;
8. encourage gender and cultural equality: Ensure that all students, regardless of their gender, background or socioeconomic status, have access to digital learning tools and resources.

3 CONCLUSION

The main lesson learned is that digital transformation needs to be thought and managed to promote inclusion, innovation and lifelong learning. The

higher education system - together with other key stakeholders of education, training, guidance and the labour world – is called to play a crucial role in preparing people for future challenges. The ICTs have the potential to offer lifelong learning opportunities to a wide constituency of learners. However, unless the issue of access is addressed, the ICTs will increase divisions within societies. States and education authorities at the national and local levels are acknowledging the need to adopt policies and strategies to ensure affordable access to infrastructure and equipment, as well as the development of information technology literacy skills.

This Project aimed to address these issues in a systematic and detailed way. The five Intellectual Outputs were planned to study the Empowering of Competencies for Online Learning in HE from all possible angles.

The comparative analysis of national reports extracted six development topics (clusters) which were then analysed: Digital innovation impact; Digital innovation strategies; Digital learning process; HE institution digital innovation; Pandemic's impact on the teaching-learning experience; International Quality Standards.

The research used the idea that it was possible to analyse the dimensions of students' digital maturity by studying their perceptions of the university's capability to carry out good processes and services for the digital learning experience. Secondly, five latent factors have been identified, which concern many aspects of students' experience relating to the implementation of digital technologies into their universities' processes. Based on these observations, students were classified into seven clusters according to their orientation towards the five latent factors of students' experience. Three main factors seem to play a part in all these results: the difference between traditional and online universities, the difference

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between the national digital development level (based on the DESI index), the student's fields of study. Attending an online university rather than a traditional one certainly has an important weight on a student's experience. The level of digital technologies implementation is certainly different between these two types of universities: a university based on online teaching tends to concentrate most of its resources on digitalisation processes. As seen, it is equally important at the national level of digital implementation. High DESI countries seem to arouse in students more positive perceptions about digital maturity. Essentially, students seem to develop their own perceptions and divide into different clusters based on their own contingent lives. It has to do with nationality, the type of university attended, and the field of study. Indeed, it has been observed that students attending natural science faculties tend to have greater skills and familiarity with digital processes.

All these dynamics seem to affect each other, making sense of the differences between the perceptions about the level of digital maturity of different universities. They also help explain students' placement in different clusters based on their orientation towards the latent factors of digital maturity. Being aware of the multiplicity of variables involved is important to understand the differences that have occurred in the case studies. Similarly, it is important not to underestimate the extent of such differences, given the ease with which they can turn into disparities.

An On-Line Training Model, designed by UOC and implemented in all six countries of the Project, came up with the 10 key components of online teaching and learning: Student's active role; Competences; Active and collaborative methodologies; Wide typology of e-activities; Asynchronous and synchronous communication; Resources for teaching and learning;

Continuous assessment; Teachers' role as a guide; Planning; Stable learning environment, and well-bounded tools.

It was observed that participants without online teaching experience and/or collaborative work experience faced difficulties during the training due to their lack of knowledge in both competences. Also, participants misunderstood the rubrics provided to evaluate the achievement of competences. A big challenge was participants without experience in collaborative work, the coordination between other group members at the beginning. Training becomes a great opportunity to achieve new learning outcomes when this initial difficulty is overcome. So, the e-learning environment should be familiar to participants (teachers and learners) for that purpose is appropriate to offer pre-training to the participants.

To effectively use this tool, it is important to ensure previous knowledge of some competences before participants enrolment in online training, as well as knowledge of the platform and its accessibility for both teachers and learners. It is also important that activities the participants have already created or use in their day-to-day courses can be integrated or adapted. And lastly, it would be useful to incorporate some synchronous sessions when planning the training, to check for any aspects to improve or clarify.

Educational Gamification, i.e., the use of game elements and game design techniques in educational contexts was also explored and discussed from the point of view of the Higher Education teachers involved in the ECOLHE pilot training, highlighting what they perceived as the most relevant advantages and disadvantages of gamified learning and reporting their suggestions on how the disadvantages could be mitigated. The findings highlighted that the HE teachers involved in the ECOLHE pilot training showed an overall positive attitude towards gamification, but that this

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approach also raises doubts regarding its implementation and its effectiveness.

Three advantages are considered the most relevant, if we consider the frequency of answers in both 'relevant' and 'highly relevant' options of the Likert scale: 'Promotes cooperation, teamwork, communities of learning and practice'; 'Foster motivation and engagement'; 'Improves knowledge absorption and retention'. The advantage that was deemed 'not relevant' by most participants was 'Applies and practices learning within a meaningful and authentic context', but still, the percentage of participants that rated it in this way was very low (13,6%), so we can conclude that only a small part of participants think that this aspect is unimportant.

Analysing the results concerning the disadvantages of gamification, a first aspect that can be noted concerns the high number of participants who rated the 'Absorb teaching resources and is time-consuming for the teacher' disadvantage as 'relevant'. The disadvantage 'Does not meet the learning needs of all learners' saw most participants rating it as 'moderately relevant'.

The doubts about gamification may also be connected to the age and habits of some teachers. A very important factor for those feeling uncomfortable with it may be the age of some participating teachers explaining their discomfort with changing their teaching methods after a long time. This can also be a problem with regard to students, particularly if they are used to the traditional lecturing approach. Gamification could offer new possibilities, but at the same time, it can be challenging to figure out practical solutions if students are strongly accustomed to traditional teaching methodologies.

Overall, based on the results of the gamification advantages and disadvantages evaluation, and on the comments provided in the open-ended questions, the general feeling of the respondents about gamification is positive. However, there are also doubts and resistance connected to the preliminary work, knowledge and resources necessary to implement a gamified course in an effective way. Therefore, it can be argued that to empower teachers to adopt educational gamification practices at the higher education level, it might be useful to scaffold them with appropriate training paths that, in addition to providing them with basic skills, aim to expose them to different best practices and to put them in contact with other university teachers with a similar academic background, but with more experience in implementing gamified activities, who can offer them useful guidance in designing and implementing their first gamified courses.

The ECOLHE project also deepened the understanding of the central role of the learners in the approach. By the use of SLP, a participatory approach to curriculum design with the inclusion of learners as stakeholders in the design of their own curricula - not learners and stakeholders but learners as stakeholders. The results showed that engaging with SLP is a reflective process that can be used effectively at any stage of the curriculum design process, being a holistic open pedagogy approach that opens the university curriculum design processes to learners and external stakeholders.

The results of this analytical and detailed research were transformed into a set of guidelines for Academic bodies. These Policies recommendations were classified into those regarding the digital transformation of HEIs; HEI digital impact, both in Digital infrastructure, and in Technical and Pedagogical support; HEI Digital Learning Process; HEI Digital Innovation

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& Strategies; the Pandemic Impact; Quality Standards; Digital Technologies in HEIs; Online Training model for improving teachers in HE, and the adoption of Gamification in HE. This extensive set of Guidelines and Recommendations based on the tedious research by the participants of this Project constitutes an effective handbook for academic bodies in the field of Onlife Learning Competencies.

The idea of the ECOLHE Project born before the pandemic because there was already a clear awareness that the higher education system had to start dealing with more intensive use of ICTs in teaching and learning processes, as well as in organisational ones. Today, the objectives and the research questions of ECOLHE are more pertinent than ever. Digital maturity is a complex concept which has different facets, and sometimes it has nothing to do exclusively with the "digital" field. Being aware of the multiplicity of variables involved is necessary to explore deeply the differences that can occur between different case studies. The presented work aims at being a valuable tool towards this direction.

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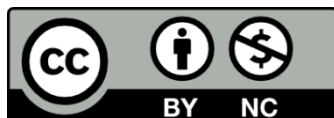
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