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"SOLET", A SELF-ORGANISED LEARNING ENVIRONMENT FOR TEACHERS ABOUT CRITICAL DIGITAL LITERACIES: PROPOSAL AND VALIDATION

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Abstract

This paper introduces the professional learning offer generated through an EU Erasmus+ transnational collaboration, denominated "SOLET" (Self-Organised Learning Environment for Teachers). Given the concerns and issues raised in the literature on teachers' professional development; and the particular difficulties in getting the appropriate training during the pandemics, such online training possibility could be an effective approach. SOLET aims to promote challenge-based activities addressing the integration of conceptual reflection with design-thinking through flexible pathways where the teacher decides the deepness and length of their engagement. Moreover, taking into account the concept of "comparators" developed by Nicol [1], the learning architecture embraces automatic, self, and peer-assessment as specific activities providing sources of comparison for the participants' reflection on their learning. The SOLET environment is under development, and two user testing rounds have already been undertaken. The first has included eight researchers from four universities and one training institution, collecting 161 review comments. The second user test was carried out by five teachers in two collaborative sessions; 18 reviews were collected. These results are discussed in light of the research relating to teachers' self-paced professional learning. Finally, the presentation of SOLET in the conference context might encompass a unique opportunity to collect feedback.

Keywords: Critical Digital Literacy, Teachers continuing education, self-organised learning, online learning.

1 INTRODUCTION

The policies for the development of digital competence have been considered crucial since the '90s. Since then, the role of teachers has been deemed central for the integration and effective use of technology in education [2]. However, while most school teachers recognised the potential of digital technologies and the internet [3], the implementation remained limited and technology at school unused [4]. Authors pointed out, though, that the difficulty would lie in the lack of skills to use technologies for educational purposes [5]. The pandemic clearly highlighted this situation of technological underuse and lack of teachers' training [6]. Indeed, in the last five years, the economic, social and technological environments had already been creating significant new challenges for understanding what it means to be digitally literate [7]. The policies of providing technological devices and adopting effectively digital tools were criticized under the lens of the complex development of the technological panorama, where the social and cultural phenomena were imbricated. This situation raised questions regarding the role that formal education institutions and teachers within them might play in supporting learners with developing new forms of digital literacy. Although developing such competencies had been seen as an important facet of teacher and learner education [8], training activities and curricula often are predominantly focused on the acquisition of technical skills while cultivating a more critical disposition towards emerging phenomena in the digitalised world is often overlooked [9]. In a sudden, the pandemic arrived, raising even more questions and highlighting the compelling need of revisiting teachers' professional development and re-focusing it on the development of critical digital literacies [9]. Even though the provision of teachers' opportunities to learn has been a source of concern for a while [10][11], the main problem is the lack of matching between the teachers' learning needs and an abundant learning offer. Indeed, the literature suggests that the teachers struggle to achieve the relevant professional

competencies to deal with an evolving technological panorama. The problem of teachers' technological uptake is complex, in any case [11] [12]. After nearly 30 years of research, the value of generating a more integrated learner-centred perspective to nurture teachers' confidence in their own capacity to integrate innovations in the ICTs into teaching has been consolidated [12]. Peer-learning and coaching have been also considered relevant [13]. In the post-pandemic scenario, the need of such integration has been demonstrated to be critical at a global level. A study involving 52 countries [6] demonstrated the need of generating online learning environments with resources and strategies for the teachers to develop fluid and strategic working groups. Such working units are able of rapid troubleshooting, problem-solving and creative thinking upon available local strategies [14]. Particularly the so-called "learning ecologies" [15] approach has focused the debate on the teachers' individual, flexible, personal search of resources, engaging in activities and nurturing relationships that support unique professional learning pathways [16], [17]. The contextualised and personal approaches might endow the participant to deal with difficult topics finding original responses to the professional challenges that trigger learning. Nonetheless, such an approach is probably based on the individual's ability to self-assess and determine their learning activity, as well as to peer-evaluate other colleagues to nurture crucial relationships supporting peer learning [13][18].

This paper aims at introducing an approach supporting the teachers' transition to embrace technologies through a critical lens. Such a professional learning approach is denominated "SOLET" (Self-Organised Learning Environment for Teachers) and attempts to deploy a space that nurtures the teachers' professional learning ecologies. In this regard, the crucial role of self and peer-assessment is supported through several strategies. In the remainder of this paper, we introduce the main concepts adopted to envision such a professional learning approach. We discuss the self and peer evaluation as drivers of competence development in regard to a complex, evolving problem, as it is a critical approach to digital technologies. Therefore, we move to the description of the course and the initial user-test developed with expert educational researchers and teachers, part of the consortium, putting the basis to validate or reconsider the initial learning design hypothesis connected to the course contents and activities.

2 BACKGROUND

Our approach stems from our understanding of effective teachers' professional learning and adult learning overall. In this regard, flexible pathways have been considered a relevant strategy, and the MOOCs' hype in the last decade has demonstrated mainly the interest in the approach, but also, the limitations [19]. Specifically, the fact that the participant is left alone in front of new knowledge, and particularly in digital environments with different types of resources and self-paced activities, can become stressful [18]. Indeed, the learners are unable to regulate their learning in the absence of external feedback: as envisaged in the self-regulation conceptualisation planning, monitoring and self-evaluating learning becomes an incomplete process without forms of social regulation or co-regulation [20]]. To advance in this idea, we build over the theories of peer and self-assessment and feedback, particularly applied to the field of professional learning. Strategically designed self-assessment [21] [22] and peer-assessment [23] have been supported by empirical evidence as key approaches to trigger reflection and self-determination as a learner. In the specific case of teacher education, self-assessment and peer-feedback have been long considered insightful and effective in triggering appropriate professional knowledge and skills. However, this requires engagement and practice [22][23]. Overall, they are two sides of the same coin: a reflective practice of assessment by the learner, that enables her to become an independent, lifelong learner. Nonetheless, there are slight differences in the techniques and impact that are worth considering here. According to Bourke self-assessment can be defined as a process where the person directs the attention to her own performance against pre-determined standard criteria [21, 69, p. 859]. Along the process, the person considers her initial goals and reflect upon the ongoing or final outcomes, making connections with their feelings and ideas, going from motivation to the more operational tasks and efforts made to achieve such outcomes. In this regard, self-assessment cannot be deemed a mere technique, but an educational strategy to support active engagement and reflection, which is particularly appropriate in professional contexts of learning [21] [22]]. In fact, self-assessment cannot be based on the traditional decision relating to a "pass-fail" situation, but an honest and effortful exercise. This generates an "internal point of view" which is completely different from the teacher and the peers' assessments [21]. Peer assessment instead changes the focus from the internal planning and performance to an external target, a classmate or peer [23]. As a peer, indeed, the other can be seen as somebody in an equal position. Moreover, the person cannot consider herself as an expert but emphasises the peer being evaluated and attempting to produce a fair judgement [24]. Amongst the positive effects relating to peer assessment, some have pointed out the improvement of

further performance, learners' interaction and the better understanding of criteria and assessment methodologies [23].

At this point, it would be relevant to consider the common element across the two approaches to feedback and assessment: the presence of "comparators" as defined by Nicol [1], in terms of the effective elements supporting learning. As referred to by Nicol, the students' generate internal feedback by comparing their current knowledge against some reference information. Nicol moves further the idea of having a specific source of feedback: this researcher emphasizes the idea that any source can trigger a judgement of performance, like a recommendation, a reader response, a noting of strengths or weaknesses. Nicol's perceives internal feedback as: "*the new knowledge that students generate when they compare their current knowledge and competence against some reference information*" [1, p. 757] The relevant concepts hence are internally generated by the learner, through comparisons with external cues that provide information on the learner's activity, performance, process, past activity, etc. In his approach, he places as a central element the activity of comparing guides: a) centering the learners' goals, b) implementing tactics & strategies, c) generating internal products. These three elements are part of the internal mental environment, which enters in contact with an external environment composed of a myriad of resources, activities and relationships: what in our view is the learning ecology that continuously evolves. In a nutshell, according to this model, it is necessary to provide sources of comparisons as a mechanism for internal feedback and self-and co-regulation of learning. Furthermore, this situation facilitates the accomplishment of short, but relevant personal pathways of learning on the topics. In this regard, the search for self and peer-assessment as strategies to monitor and evaluate the progress of learning becomes central. In this regard, the theories on self and peer learning could integrate the concept of learning ecologies. It is impossible for learners to develop a learning ecology if there are no "cues" or references from the digital context helping them to compare their past performance with their current performance, an extremely relevant approach in adults' and professional learning [17]. Moreover, we hypothesise this comparison will support the development of future tasks (integrating resources, searching for relationships and defining activities) so that learners can keep on growing their learning ecology.

3 METHODOLOGY

Given the aforementioned premises, the DETECT SOLET embraced Nicol's theoretical vision of "comparators" at the crossover with the idea of developing flexible environments nurturing the teachers' lifelong learning ecologies. In the following, we briefly introduce the course context (content and pedagogical approach), focusing on the key elements in our model which can be defined as a source of comparison in an environment that is self-paced. We particularly emphasise the role of three comparators: automated feedback, self-assessment and peer feedback. As a complement, the environment offers design elements that facilitate the learner's experience concerning the familiarisation with the model, workflow, and expected outputs.

3.1. Situating the DETECT SOLET

The DETECT project (<https://www.detectproject.eu/>), focused on the development of teachers' strategies to teach Critical Digital Literacies is based on the collaboration of a transnational, European consortium in the context of the Erasmus+ Programme. The group was constituted indeed by one university and one school from four countries: from Finland, Italy, Spain and UK. One of the DETECT project's Intellectual output is to design a self-paced e-learning course with relevant content and learning tools providing an effective professional learning experience about Critical Digital Literacies: the SOLET. The expected participants of the SOLET are mainly teachers from primary and secondary schools, as well as school leaders from Europe, but the open nature of the environment might encompass the engagement of global participants. The self-organised learning environment offers five modules that cover conceptual dimensions of the CDL and specific teaching CDL cases relating to primary and secondary education, from UK, IT, ES and FI. Also, two modules cover more transversal topics like instruments to search and retrieve educational resources supporting the development of CDL and developing lifelong learning ecologies as an approach to develop CDL beyond the classroom and the school and across contexts of learning. These contents are delivered through a challenge-based approach, where the learner can find several levels of interaction with the materials, from simple knowledge and understanding to developing critical awareness through investigation and creative, design-thinking through challenges and design for learning templates. Everything is wrapped up with self-assessment and peer-learning instruments and spaces. As for the technological features, the

SOLET is implemented on a Moodle platform. Moodle is an open-source learning administration system that is used for learners everywhere and is the core of the world's most adaptable and reliable online learning solution. Figures 1 and 2 show the SOLET contents (Modules) and the pedagogical approach (challenge-based learning).

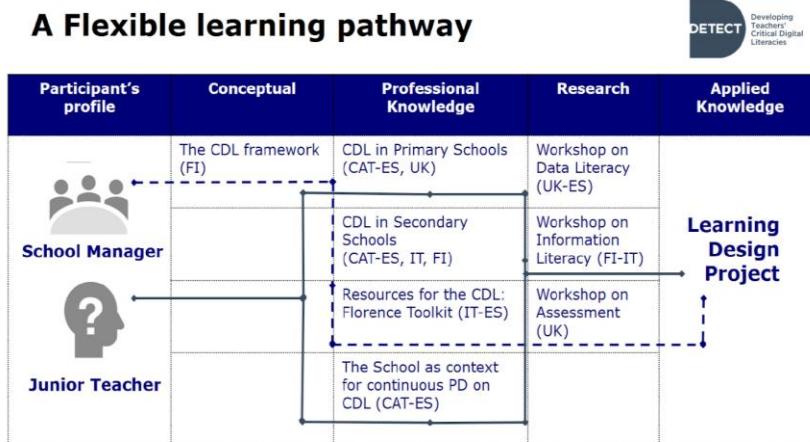


Figure 1 SOLET content as a flexible learning pathway



Figure 3 SOLET challenge-based learning

3.2. Automated feedback, self-assessment and peer-feedback: SOLETs comparators

In this section, we explain the elements in the SOLET acting as internal comparators. Table 1 reveals the techno-pedagogical layers and starts at the pedagogical level, which is offered through the online, self-organised environment. We also introduce the hypothesis on the type of learning that should be triggered through a specific comparator. Beyond the elements in table 1, to analyse the overall approach, we will share a final survey for the participants' evaluation of the course.

Table 1. SOLET elements acting as comparators

SOLET's comparators	Elements	Hypothesis on the type of learning expected to trigger through the comparator
Propaedeutic Environment	The Modules' approach: six stages with increasingly active learning architectures	Awareness of the preferred type of learning (Knowing, Understanding, Creating, Contributing and sharing)
	Conditions to access the activities	Self-organisation and monitoring

	Use of icons and colours	Priming effect, supporting anticipation of the learning topics and activities
Automated feedback	Possibility of choosing the appropriate pathway according to several feasible pathways and certifications	Planning learning achievements
	Online quizzes	Awareness of the learning gaps Content knowledge
	Open Digital Badges Ecosystem	Global Awareness on the achieved skills and planning new aims.
	Certifications got according to the type of engagement (based on the modular structure)	Global Awareness on the achieved skills
Self-Assessment and feedback strategies	Reflexive tasks with self-assessment rubrics[1]	Monitoring the achievement of specific knowledge (e.g., understanding the critical digital framework) and skills (e.g., designing for learning on critical digital literacies)
	Reflexive tasks with worked examples (by expert teachers)	
Peer-Assessment and feedback strategies	Sharing products and comparing with overall statistics	Evaluating knowledge achieved (e.g., areas of the CDL framework where there is overall and individual better/less understanding)
	Discussing strategies and sharing resources along the process	Deepening on the CDL areas of knowledge and practice through social learning
	Rating other learners' products	Deepening on the CDL areas of knowledge and practice through social learning
	Commenting and discussing on other learners' products	And Contributing to a collective experience of knowledge building









A relevant note relates the description of the Open Digital Badges (ODB) as a source of self-regulation. ODB consist on the sets of icons, implemented in technological learning environments, which can be issued by educational institutions (or other types of institutions promoting educational initiatives) and displayed by users to show their learning achievements [25]. The badges should be portable, linked to open pathways of learning, and hence transparent to both the organization that releases them and to those willing to know about the learners' achievements [26]. The assessment strategy of the DETECT SOLET is developed with a badge ecosystem that takes into account the validation both of hard (technical, operative) and soft (interpersonal, behavioral) skills. For each of the six stages of activity (Fig 2) within the five modules described in the Course Syllabus, a specific assessment activity is provided. Each assessment activity leads to the achievement of elements supporting the release of specific Digital Badges. Therefore, we have designed a "structure" where course contents, activities and expected learning outcomes are clearly aligned and explicit to learners. Such a "structure" is composed of: a) a **Knowledge Map** provided by the Syllabus and the CDL framework [9]; b) a **Competence Map**, with four levels of competence relating to knowing –K-, understanding –U-, creating –C-, contributing and sharing –CS-; c) **the assessment activities**, aligning with the Knowledge and the Competence Map, where for every competence and level there is a specific type of assessment activity; d) **the badge ecosystem**, consisting on one badge per type of competence (as explained later). Table 2 introduces the Competence Map and the assessment activities as the basis of the badge ecosystem, introduced in table 3. The badge ecosystem reports labels that reflect the type of competence achieved about the CDL: "aware teacher", "informed teacher", "collaborative teacher", "creative teacher".

Table 2 The Competence Map (CM) and the connected assessment activities

	Module I: Introducing the CDL	Module II: Applying the CDL to Primary School Teaching	Module III: Applying the CDL to Secondary School Teaching	Module IV: Instruments to develop teachers' CDL	Module V: The school as ecosystem for the development of CDL
K [F0-1]	...the CDL	...information literacy or digital well-being as elements of the CDL	...information literacy, digital well-being or communication and collaboration as	...teachers' ability to search quality resources about teaching and learning CDL	...strategies at school to develop learning ecologies around the CDL

			elements of the CDL		
Assessment Activities: Quiz, Comparison with others' responses, Activities Completion					
U [F2]	...the implications of a critical approach to the technologies in teaching ...the areas of the CDL best / less developed	...the main debates and literature defining the field and practice around information literacy and digital well-being	...the main debates and literature defining the field and practice around information literacy, digital well-being or communication and collaboration	... teachers' ability to search quality resources about teaching and learning CDL	...strategies at school to develop learning ecologies promoting a CDL
AA: Comparison with others' responses, Activities Completion, Self-Reflection					
C [F3-4]	...design ideas to approach the CDL at school	...a learning plan to develop a critical approach to information literacy or digital well-being	...a learning plan to develop a critical approach to information literacy, digital well-being or communication and collaboration	...a participant's search of quality resources to teach and learn CDL	...a participant's map of strategies at school to develop learning ecologies promoting a CDL
AA: Understanding the challenge, Developing a design idea or a learning plan, Self-assessment with rubrics					
CS [F5]	...design ideas to approach the CDL at school	...the learning plan (...)	...the learning plan (...)	...the participants' maps	...the participants' maps
AA: Sharing to specific spaces (database), Discussing at forum, Self-assessment					

Table 3 The Assessment Map (Badge Ecosystem Generator)

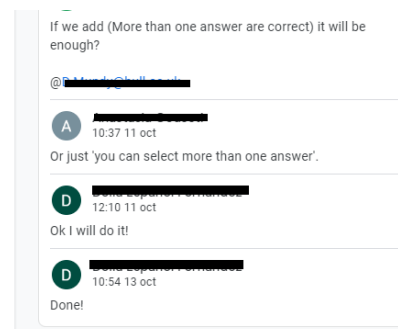
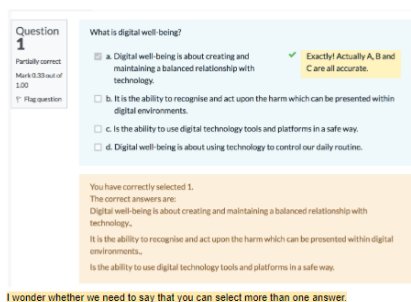
	M-I	M-II	M-III	M-IV	M-V	All modules
K [F0-1]	CDL theory: Aware Teacher 	CDL practices in PS: Aware Teacher	CDL practices in SS: Aware Teacher	CDL tools for practice: Aware Teacher	Developing CDL at school: Aware Teacher	
U [F2]	CDL theory: Informed Teacher 	CDL practices in PS: Informed Teacher	CDL practices in SS: Informed Teacher	CDL tools for practice: Informed Teacher	Developing CDL at school: Informed Teacher	
PATHWAY I	Module certification pathway I	Module certification pathway I	Module certification pathway I	Module certification pathway I	Module certification pathway I	
[+ Final SelfTest] Course Certification of participation						
C [F3-4]	CDL theory: Creative Teacher 	CDL practices in PS: Creative Teacher	CDL practices in SS: Creative Teacher	CDL tools for practice: Creative Teacher	Developing CDL at school: Creative Teacher	
CS [F5]	CDL theory: Collaborative Teacher 	CDL practices in PS: Collaborative Teacher	CDL practices in SS: Collaborative Teacher	CDL tools for practice: Collaborative Teacher	Developing CDL at school: Collaborative Teacher	
PAT HW AY II	Module certification pathway II	Module certification pathway II	Module certification pathway II	Module certification pathway II	Module certification pathway II	
Course Certification of Accomplishment with Credits' recognition						

3.3. User Testing as part of a collaborative design within the SOLET

Most advanced design approaches require participatory approaches where the features and interactions get checked by a number of relevant users. The successful user experience (or UX) within and regard to a system has been conceptualised as “usability”. The ISO 9241 (<https://www.iso.org/standard/16873.html>) that highlights ergonomics on human-system interaction defines usability as “the extent to which a product can be used by specified users to achieve specific goals with effectiveness, efficiency and satisfaction in a specified context of use”. So the key concepts to define usability are effectiveness, efficiency and satisfaction. The Interaction Design Foundation defines usability testing (<https://www.interaction-design.org/literature/topics/usability-testing>) as “the practice of testing how easy a design is to use with a group of representative users. It usually involves observing users as they attempt to complete tasks and can be done for different types of design”. The more the users get engaged along with the phases of development through progressive testing, the more the final design outcome will be useful, appropriate, knowledgeable and enjoyable. The user test implies the critical appraisal by an initial number of significant users that might determine to which extent the learning design hypothesis holds. Hence, in designing SOLET, particular attention was put to the interactive contents that help the asynchronous self-placed learning. Ultimately, it was considered that the appropriate methodological approach could support a good exploration and appropriation of the Critical Digital Literacies. Most importantly, the usability testing would lead to detecting crucial improvement points that may require specific attention in order to adjust the current proposal to an optimal alignment with the self-organised learning environment planned. As for the format of the user testing, the participants were given a Google document with initial examples of reporting ideas, concepts, and problems. The interaction with the materials could be said informal, intensive (full engagement with all the/the whole? SOLET proposal for at least one of the modules) and qualitative (we privileged written and oral comments to forms collecting data). During October and November 2021, all DETECT project partners conducted their user testing. Initially, the four universities engaged in the first loop of intense revisions, more connected with interaction and textual elements. In a second moment, the school's partners discussed the effectiveness of materials and integrated them with examples of practice. Overall, the UOC team recruited six groups of participants who did the user testing.

4 RESULTS

In the following, we introduce three print screens describing examples of the dialogic interactions through the first loop.



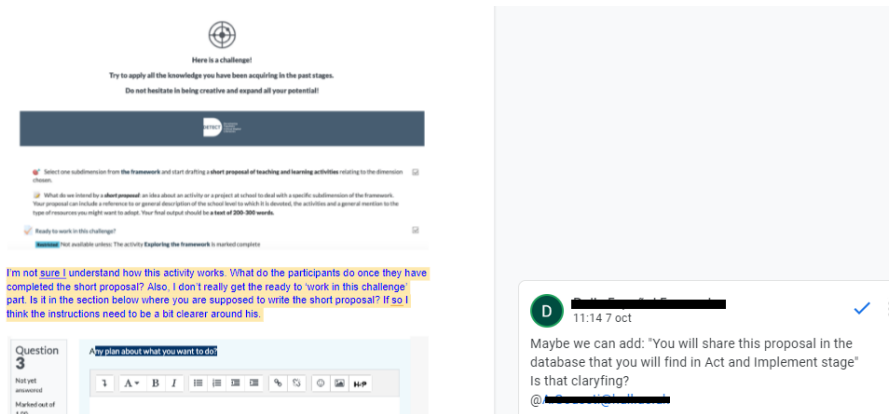


Figure 4 – Printscreens showing dialogic interactions during the user tests

As Figure 4 shows, the interactions were either focused on specific elements in the text or more deep considerations about the pedagogical interactions with the content. After having collected the comments, the analysis focused on the participants’ comments and satisfaction perception of the different modules of the Critical Digital Literacies course, according to the self-paced, self and peer-evaluation approach. The comments were classified into two categories: Type and Level of impact. The category Type was divided in the next options: Graphic error, Text Error, Graphic Aesthetics, Text Improvement, Interaction Issue and Interaction Improvement. This category should help the authors to understand the quality of the improvements to be made in order to better adjust the interaction in line with the self-paced hypothesis. As for the level of impact, the category was divided into the following options: Low, Medium and High. This categorisation should shed light on the need of critical interventions to the design and course deployment, operationalising the level of adherence to the original pedagogical hypothesis. Also, an interrater agreement between the original tester and a UOC research staff was undertaken in order to uncover areas of misunderstanding or differences in the conceptualisation of the design problems encountered by the testers. Table 4 shows the interrater agreement, displaying the total number of revisions (as illustrated above). The level of agreement was calculated by introducing a second evaluator (a researcher from UOC) who re-analysed an extracted sample of the overall commented issues (42 of 207). As it can be observed, the interrater agreement was basically good (83.33%) relating to the type of problems focused on and the request of change by the participants of the user test.

Table 4 Interrater Agreement

First UT round					
Testing group	Total revisions	Sample	Disagreements	Agreements	Interrater agreement
Italian Group	29	34.48	1	9	90
Finnish Group	48	20.93	2	8	80
UK Group	81	12.35	3	7	70
Spanish Group	47	21.28	1	9	90
Non-Academic	2	100.00	0	2	100
Total	207	20.29	7	35	83.3
Second UT round					
	Total revisions	Sample	Disagreements	Agreements	Interrater agreement
Collaborative session I	14	42.9	1	6	60
Collaborative session II	5	100.00	2	3	30
Total	19	52.6	3	9	75

Figure 5 show the analysis per category. In the analysis of the first category, it could be found that the comments made by the partners basically were centred on Text improvement or text errors enclosing the 52.7% of the comments made. Taking into consideration the qualitative interactions, it was possible to see that the text was considered relevant to support the learners’ understanding of instructions and the motivations relating to the self-paced activity. However, a number of suggestions related to language

usage, beyond any pedagogical suggestion. This type of approach generally supported the self-paced design, but was concerned about basic understanding of tasks and instructions to trigger self-reflection and learning. The interaction issues (11.5%) and the interaction errors (22.1%) cannot be certainly disregarded (33.6% together). In this case, the participants were concerned with automatic outputs like visualisations of the learner performance, and/or the online questionnaire's feedback. Coming to the second category, a relevant number of participants' comments pointed out a low level of impact (60.9%). This result generally supports the pedagogical hypothesis, since the type of comments made were most in the direction of adjustments and expansions of the information given. The "high impact" requests, though, mainly related to the canonical features of the Moodle platform, with some of the users preferring a much more graphical approach with less textual information. This was particularly true in the case of the teachers.

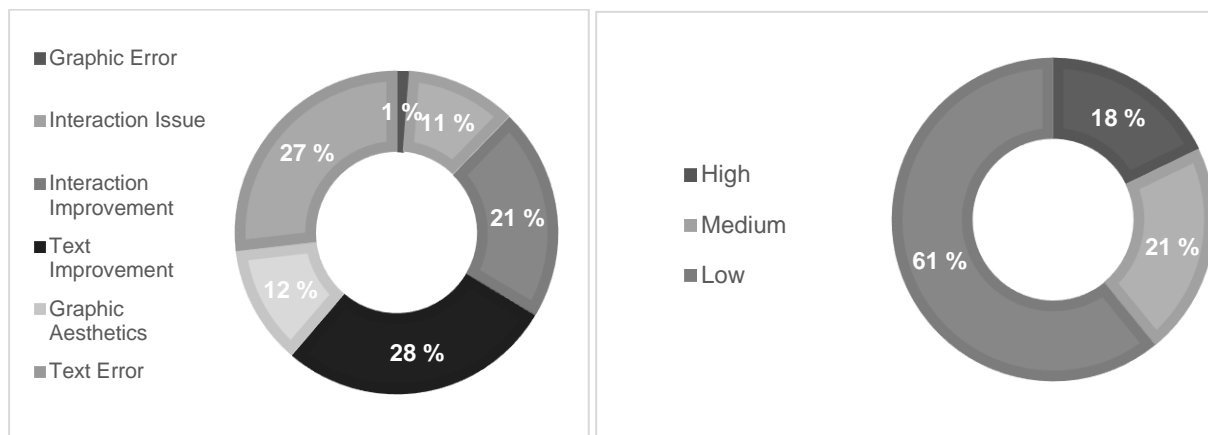


Figure 5 – Types of issues commented during the user test and their Level of impact

Overall, the participants found it easy to navigate and to engage with the activities, but their concerns went mostly in the direction of the type of platform adopted and some of the features imposed by default; as well as the relevant information that the user needs to work in a context where there is no teaching staff that can provide support.

5 DISCUSSION AND CONCLUSIONS

As a preliminary approach to validate our pedagogical hypothesis and the technological instantiation, in this paper we adopted a participatory technique of designing based on two progressive usability tests with relevant participants, namely, university researchers and educators, and secondary and primary teachers of four different countries. Generally speaking, our user testing provided good means to consider that the pedagogical hypothesis holds, therefore, the SOLET could provide an informed perspective to teachers and their educational institutions. As for the validity of the approach and design, the teachers and school leaders will probably find (as the "testers" did) a flexible, personal pathway to learning about CDL. This is, in any case, an element that goes beyond the user test and that requires further analysis through interviews and questionnaires with actual users. Coming to the self and peer assessment strategy, the proposed design, as described, includes components to enact forms of automatic feedback, trigger self-reflection and comparison with peers-responses, and enables social interaction with other participants through asynchronous means. Enhancing self-monitoring within the SOLET by offering automatic feedback in the different phases of the modules, self-assessment and peer asynchronous interaction was a minimal design, envisaged upon the idea of a self-organised learning approach. Though the user-test focused on specific interactions, the prevalence of "low" incidences support the approach. In fact, the testers highlighted issues in the interaction, the graphic representation, and particularly the texts that make clear to the users what motivates them to follow activities. Moreover, the learning environment and the challenge-based learning by phases proposed a structure that becomes progressively familiar and makes the participants perceive themselves as accompanied, avoiding the feeling of isolation that usually occurs in self-regulated learning processes. As expressed above, the limitations of our method are based on the type of participants (people that are familiar with the contents and the overall learning project within the DETECT network) and the "artificial" approach to the SOLET (usability testing). Successive iterations of the course, through design-based research, might shed light upon the effectiveness of our approach. The self-assessment (based on comparisons

with others' opinions, namely, not performance in terms of marks, but in terms of perceived knowledge) was considered crucial from the beginning. In fact, the DETECT teachers, as "testers" were particularly rigorous in providing materials coming out from their professional practice. In this regard, the SOLET underpins a theoretical-practical reference to the CDL that is offered to the participants during the different phases of each module [1]. As for the peer feedback, the SOLET design emphasised other points of view on the participant practice and proposals [1]. Nonetheless, we must see to which extent the real participants will engage with this approach, which was deemed correct and even necessary along the designing process, offering for example online forums and rating tools. Though this was generally validated during the usability testing, as it is currently in self-paced activities, the participants tend to engage through highly individual approaches [18]. Finally, the open badges were proposed as a micro-credentialing system over an automated basis, that aims at supporting learning recognition, self-awareness of the progress. While we consider that this can be a strategy to strengthen motivation and avoid drop-out, others have pointed out the risky situation of doing just to "get the credentials" [26]. Moreover, this part was not fully checked, since the usability testing did not encompass forms of participation leading to the higher badges (creative teacher, coacher). Future work in this sense will require interviews and surveys to understand the users-engagement with SOLET, but the building foundations appear solid, through the lens of our participatory design and the following usability testing.

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