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Alfabetização agroecológica ambientalista: formação e extensão universitária para uma cidadania global responsável	775
<i>Marcos Sorrentino, Simone Portugal</i>	
Educação e cidadania: necessidades formativas dos docentes	785
<i>Ilda Freire-Ribeiro</i>	
Educação financeira e cidadania participativa: um primeiro passo no 1.º CEB	793
<i>Lina Fonseca</i>	
Educação para o desenvolvimento na formação de professores: a perceção dos estudantes	803
<i>Maria da Conceição Martins, Angelina Sanches, Sofia Bergano, Elza Mesquita, Ilda Freire-Ribeiro</i>	
El profesor-tutor en los programas de tutoría entre iguales en la universidad	813
<i>Yadirnaci Vargas Hernández, Vega María García González</i>	
Estudiantes universitarios y sus trayectorias formales e informales con las TIC: tecnobiografías .	821
<i>Eduardo García Zamora, Pilar Rodrigo Lacueva</i>	
Formação continuada em contexto: ensino de estatística com recurso à tecnologia digital	831
<i>Cristiane de Fatima Budek Dias, Caroline Subirá Pereira, Marcos Mincov Tenório, Guataçara dos Santos Junior</i>	
Formação continuada para o ensino de estatística: as pesquisas no cenário brasileiro	841
<i>Cristiane de Fatima Budek Dias, Caroline Subirá Pereira, Marcos Mincov Tenório, Guataçara dos Santos Junior</i>	
Global Schools: integração curricular da ED/ECG no ensino básico	850
<i>Luísa Neves, Alexandra Esteves, Ana Barbosa, Eliana Madeira, Gabriela Barbosa, Joana Oliveira, Jorge Cardoso, La Salete Coelho, Teresa Gonçalves</i>	
Perfil dos docentes da UTFPR, única UT brasileira: do ideal ao real	860
<i>Caroline Lievore, Luiz Alberto Pilatti</i>	
Valores emergentes em texto dramático para a infância percebidos por futuros professores . .	868
<i>Carla Guerreiro, Paula Fortunato Vaz, João Lopes Marques Gomes</i>	
Práticas Pedagógicas no Ensino Superior	875
Abordagem das transformações geométricas com futuros professores do ensino básico	877
<i>António Guerreiro</i>	
AduLeT project and educational technologies – upgrades to the state of the art	886
<i>Vítor Gonçalves, Isabel Chumbo, Elisabete Mendes Silva, Maria Raquel Patrício</i>	
Arte y pedagogía, binomio perfecto en la formación de pedagogos	897
<i>Sonia Rodríguez Cano, Concetta Maria Sigona, Vanesa Ausín Villaverde</i>	
Ensino de álgebra linear no ensino superior politécnico: práticas e implicações	902
<i>Paula Maria Barros, José António Fernandes, Cláudia Mendes Araújo</i>	
Envolvimento dos estudantes no ensino superior: análise em função de variáveis contextuais . .	912
<i>Filomena Covas, Feliciano H. Veiga</i>	
Estágio supervisionado e identidade docente na licenciatura em matemática no IFPE	921
<i>Rosa Maria Oliveira Teixeira de Vasconcelos, Hélio Oliveira Rodrigues, Suzana Maria Barrios Luis</i>	

AduLeT project and educational technologies – upgrades to the state of the art

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Abstract

Higher education teachers are now facing bigger challenges than ever before regarding students' motivation and effective learning. The teaching model paradigm has been rapidly changing over the last decades due to the wide array of technological tools available to every student, namely smartphones, social networks, new platforms and devices which cater for new teaching/learning methods and tools. Technology can either represent an added-value in the learning/teaching process or it can be a major failure if teachers do not have enough knowledge or skills to deal with it in the most adequate way. It is in this context that the “AduLeT - Advanced use of Learning Technologies in higher education” project emerged in 2016 and will operate until 2019. This seven partner-consortium international project aims at creating a Community of Practice to improve the teaching quality of lecturers by enhancing their skills concerning the use of technologies in an advanced way. The aims of this paper are as follows: 1. to describe the project design, focusing on its different stages, namely the research methods applied, known barriers and how to overcome them; and highlighting the guidelines for the effective use of “Technology-Enhanced Learning” tools (TEL tools); 2. to anticipate some known and expected results of the survey conducted in each country by the consortium partners; 3. to demonstrate how the CoP shall work by setting forth some examples of possible and already pinpointed teaching methods and tools for TEL. It is our belief that this project could present good practices for the use of appropriate educational technologies and properly conformed with teaching/learning methods applicable to the resolution of problems, difficulties, requisites of common teaching, providing a structured and meaningful model within the TEL area. Therefore, it will most certainly contribute to the modernization of Europe's Higher Education systems for education and training. We do hope that, in the long run, this community of practice grows as a whole in order to become self-sufficient.

Keywords: AduLeT, learning, educational technology, teaching, community of practice.

Resumo

Atualmente, os professores do Ensino Superior lidam com maiores desafios relacionados com a motivação dos alunos e a sua aprendizagem. Nas últimas duas décadas, o paradigma do modelo de ensino tem vindo a alterar de uma forma bastante célere devido a um largo manancial de ferramentas tecnológicas disponíveis a cada aluno, nomeadamente *smartphones*, redes sociais, novas plataformas e instrumentos que clamam por novos métodos de ensino e novas ferramentas. A tecnologia tanto pode representar uma mais-valia no processo de ensino-aprendizagem como pode igualmente revelar-se ineficaz se os docentes não tiverem conhecimento ou capacidade de lidar com ela da forma mais adequada. É, portanto, neste contexto que o projeto “AduLeT - Advanced use of Learning Technologies in higher education” surgiu em 2016 e decorrerá até 2019. O consórcio internacional que subjaz o projeto é composto por sete instituições parceiras com vista à criação de uma comunidade de práticas no sentido de melhorar a qualidade de ensino dos docentes através do desenvolvimento das suas capacidades de manusear as tecnologias de forma avançada. Os objetivos deste artigo consistem no seguinte: 1. descrever a estrutura do projeto, realçando as diferentes etapas do mesmo, bem como as suas linhas orientadoras para o uso efetivo de ferramentas de “aprendizagem assistida por

tecnologias”; 2. antecipar alguns resultados expectáveis e previstos advindos do estudo realizado por cada membro do consórcio; 3. demonstrar como a comunidade de práticas irá funcionar através da demonstração de alguns exemplos de métodos de ensino e de ferramentas tecnológicas. Acreditamos que este projecto contém os ingredientes para boas práticas relativamente ao uso das tecnologias educativas em consonância com métodos de ensino/aprendizagem aplicáveis à resolução de problemas e dificuldades, requisitos comuns no ensino disponibilizando um modelo significativo e estruturado na área da aprendizagem assistida por tecnologias. Por conseguinte, irá com certeza contribuir para a modernização da educação e formação nos sistemas europeus de Ensino Superior. Esperamos que, a longo prazo, esta comunidade de práticas se desenvolva de uma forma holística no sentido de poder tornar-se auto-suficiente.

Palavras-Chave: AduLeT; aprendizagem; tecnologia educativa; ensino; comunidade de práticas.

1 Introduction

We live in an era of mass communication and, therefore, society has been forcibly adjusting to this somewhat new reality having to deal with both the constraints and benefits imposed by the faster communication initiated by the web revolution and further enhanced by digital media and technological devices that permeate our lives, such as smartphones and social networks, just to name a few. In the current digital world, we have access to a myriad of information available at a click by means of keywords, search engines and links which connect us with the outer world.

The area of education has also not remained indifferent to this rather dominant technological framework. Basic and higher education try to accompany the pace of these powerful assets and cannot avoid being impacted by new technological devices that now represent one of the most valuable learning tools for students. Not only do students use smartphones from which they access Internet links and social networks mainly for social purposes, but they also use them to support their research and learning lives.

Flavin (2016) advocates the idea that disruptive innovation, substantiated in “simple and convenient technologies which disrupt markets for existing goods and services” (pp. 632-645), is commonly used in higher education. Nonetheless, students, apart from using these technologies as a means to support their social and learning lives, also demarcate themselves from the existent technologies by finding new and more innovative ones. This, of course, has serious consequences for the application of technology-enhanced learning (TEL) as new teaching-learning methods and tools have to be designed and improved.

The higher education context had therefore to adjust to this new mind-set propelled not only by the students but also by the current practices in TEL. Indeed, much has changed since the last decades and new methods have been put forth, discussed and implemented in classes bearing in mind the so-called digital students of the new millennium.

No more than thirty years ago, both lecturers and students were still confronted with very conventional methods, such as the direct method or grammar-translation approach, if we refer to the context of teaching languages. Based on this premise, the lecturers followed very strict guidelines regarding the syllabi and did not deviate from the path they originally had planned. Students listened to what the lecturer dictated and took notes. Laurillard (2002) presents a very clear account of what teaching and learning were like when she initiated her life as a student, in the late nineteen seventies, and subsequently as a teacher

my first lecture as a student was a wretched experience. With 199 other students I counted myself lucky that I was in the main lecture theatre and not in the overflow room receiving closed circuit television. The lecturer was talking formulae as he came in, and for fifty minutes he scribbled them on the board as he talked, and we all scribbled more, in a desperate attempt to keep up with his dictation. My first lecture as a teacher was no better. For this group, I had a syllabus listing thirty or so topics, and a timetable of three lectures a week. Fresh from finals and desperate not to bore the seventy-odd engineering students with the trivia of introductory complex analysis I prepared reams of notes from several textbooks and my own

scribbled lecture notes, entered the room talking formulae, and scribbled them on the board as I went (Laurillard, 2002, p.1).

From what the author at that time experienced, we can conclude that the words ‘board’, ‘notes’ and ‘dictation’ were somehow taken for granted as useful and, most probably, the best tools available to the teachers who followed this method. Learning based on a transmission pedagogical philosophy had shifted to a student-centred approach, making sure that student’s learning is what matters the most. The big challenge then is to avoid exerting so much control over the students, on the one hand, and, on the other, to keep them motivated to learn by focusing on different tools and different methods. However, there are no magic and ready-made formulae, but one can attempt to provide the higher-education teachers and students with interesting, effective teaching methods and tools sustained on educational technologies (edtech), encompassing a wide variety of areas, namely social media (e.g. Facebook, Twitter, among others), collaborative working (e.g. Padlet, Lino, MindMapfree) or presentation platforms (e.g. Powerpoint, Prezi, Emaze, Infographics), emerging technologies such as Artificial Intelligence, Virtual Reality or Augmented Reality, just to name a few.

Recent literature delves into the importance of edtech in the current digital world, some focusing on state-of-the art in TEL (Duval, Sharples & Sutherland, 2016) and others highlighting the higher education context regarding the use of TEL (Branch, Bartholomew & Nygaard, 2015). Selwyn (2016) alludes to the fact that nowadays it is almost impossible to dissociate education and technology, despite the fast-changing pace of digital technologies. Therefore, the author tries to make sense of technology and educational change (Selwyn, 2016).

Peter Atherton’s work (2018) is aimed at teachers, in a wide teaching range, and attempts to help them dealing with learners with the use of edtech. According to Atherton (2015)

the unspoken rules of teaching and learning had been rejected and dismantled by learners but apparently reinforced by policymakers, with whom teachers were under even more pressure to comply. In the middle were edtech providers, who were improvising, innovating, building brand equity and engaging in dialogue with educators, institutions and sometimes politicians (p. xiii).

It is in this context of innovation, adaptation, engagement and technology enhanced learning that AduLeT project was conceived and implemented with the purpose of providing higher education lecturers with a set of adequate and meaningful learning methods and tools, in the attempt to combine theoretical knowledge put forth by current research with practical experience.

In this article, we aim to introduce and describe the project AduLeT, focusing on its structure, main aims, results, arguing about the innovative value the project brings to the higher education context.

With that in mind, the article is divided into three parts in an attempt to answer three main questions. In the first –Who are we? AduLeT project/AduLeT consortium– we describe the project’s structure and aims in more detail, highlighting the different outputs intended to be accomplished in the project. In part 2, the question focuses on the work developed, giving an overall and wider idea of the progress of the project so far. Finally, we put forth some results already accomplished aiming at the ultimate goal which is the creation of a Community of Practice with an emphasis on collaborative work and best practices. To conclude, we defend the major strengths of the project, upholding its relevance in the current teaching/learning setting.

2 Who are we? – the AduLeT project/consortium

The AduLeT project has been funded with the support of the Erasmus+ programme and it had its first meeting in November 2016. It will run until 2019. This three-year project was created because of an existent gap in higher education teaching regarding an easy, organized and systematized access to a set of different combined teaching methods and education technological tools. Therefore, AduLeT’s main purpose is to improve the teaching quality of lecturers by developing their skills concerning the use of technologies in an advanced way. Bearing this in mind, the lecturers must also need to have

adequate training on how a specific teaching method can be combined with a certain technology. In addition, the project intends to provide guidelines, best practice and strategy concepts for lecturers and higher education institutions.

The AduLeT consortium is composed of seven European higher education institutions and one international education and training institution, namely the Ludwigsburg University of Education, the coordinator of the project, University of Stuttgart, Germany, Complutense University of Madrid, Spain, Humak University of Applied Sciences, Finland, John Neumann University, Hungary, the Open University of the Netherlands, the Netherlands, the Polytechnic Institute of Bragança, Portugal and PIXEL - Associazione Culturale, Italy. Each institution has several expert members in the area of education and, more specifically, in the information technology field.

The AduLeT project in its essence substantiates five main outputs: output 1 - TEL Teaching Methods; output 2 - TEL tools; output 3 - Case Studies, output 4 - Survey, output 5 - Community of Practice (CoP). These will be described in more detail next.

3 What have we done so far? – the big picture

The core objective that sustains the AduLeT project is the development of systematic guidelines based on best practices, which cover technical, didactical, infrastructural and organizational aspects so that the advanced use of technologies in higher education is facilitated. Nonetheless, complementary to common faculty trainings, AduLeT uses a pedagogical rather than a technological approach. Hence the need to reflect on and define teaching/learning methods became a top priority at the beginning of the project.

In addition, a support system to use technologies in different learning and teaching scenarios in an advanced way needs to be set up. This support system, which will ultimately result in the CoP, needs to be filled in with teaching methods and tools that will guide the teachers and provide them with ready-made and tested solutions to their teaching problems or difficulties. Apart from the transnational meetings in each European partner institution, so far, the members of the projects have already designed and agreed on a teaching method form and template, and a TEL tools form and template (Figures 1, 2, 3 and 4).

AduLeT

TEL method form

Why this template?
 The following template is based on the teaching method template as developed within the ICOPER project (<http://icoper.org/>)
 As our core goal we want to identify the main methods that can be used in the learning.

The template is organised in three main sections: the overview section should allow a teacher to identify the method as being appropriate for the learning objective at hand (or not). The details section should help to understand and apply the teaching method in a specific educational situation. The comments section comprises collected experiences and reflections about the teaching methods and represents a growing experience in applying it.

Teaching Method and Tools in AduLeT project: A common vision: https://drive.google.com/open?id=0B7mJ_5z_d1kRG9vOGIvRk1ydVU


OVERVIEW:

*Erforderlich

Partner member (author): *
 Be sure you select your name... If not, select "Other teacher or expert" and insert your name in the field "author"...

Figure 1: Teaching method form.

Each member of the project selected five or more lecturers in each institution whose role is to establish the connection with the community of teachers and the members of the project. These



Advanced use of Learning Technologies in Higher Education

Teaching method template

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Teaching Method and Tools in AduLeT project: A common vision:
https://drive.google.com/open?id=0B7mj_Sz_d11KR9vQGlvRk1ydVU


Overview

Author:

Title of teaching method: *

A teaching methods comprises a set of methodologies, strategies and techniques, tools and learning activities, e.g. *Ten-Plus-Two method, brainstorming, mental/conceptual maps, debates or discussion groups (task-based learning, Socratic), lectures, demonstrations, role plays, study assignments, tutorials*.
 For more information visit:
<http://collections.infocollections.org/ukedu/en/d/Jgtz017e/6.9.1.html#Jgtz017e.6.9.1> or
<http://teaching.unc.edu/learning-resources/articles-books/bestpractice/instructional-methods/150-teaching-methods>

Figure 2: Teaching method template.



TEL (Technology Enhanced Learning) tools form

*** Erforderlich**

Participant Partner *

Auswählen


Name of the tool (category): *

Example 1: e-learning platform; example 2: Mind map online tool ; example 3: videoconferencing tool

Meine Antwort

Part of the tool or subcategory (if needed):

Figure 3: TEL tools form.



TEL tools template

Why this template?
As our core goal we want to identify the main TEL tools that can be used in higher education.

Author:

Name of the tool (category):
Example 1: e-learning platform; example 2: Mind map online tool; example 3: videoconferencing tool

Part of the tool or subcategory (if needed):
Example 1: Moodle quiz or Moodle Lesson; example 2 and 3: there's no subcategory

TEL methods where this tool fits:
The teaching methods must exist or be previously described in TEL method form. Just to remember: TEL method comprises a set of methodologies, strategies and techniques, tools and learning activities, e.g.: Ten-Plus-Two method, brainstorming, mental/conceptual maps, debates or discussion groups (task-based learning, Socratic), lectures, demonstrations, role plays, study assignments, tutorials.

Figure 4: TEL tools template.

representatives in each institution indicated some participants willing to give their contribution to the project. A selection was made based on two main assumptions: first, lecturers, from all fields of study, who have already some experience in using technologies and, second, even if they have little experience dealing with a more technological teaching approach, they have a keen interest in finding more about this particular field and are eager to use technologies in their teaching.

Therefore, in order to introduce the AduLeT project to the participants, two workshops have been arranged in every participating country. In Portugal, the first round of workshops already took place in summer 2017 and the second took place in summer 2018. These “Build the Community” workshops aim to evaluate the teaching methods and the TEL tools and also to include the participants’ ideas and their improvement suggestions regarding the project. So far, their contribution has been very valuable and it helped to adjust some of the project’s guidelines. The participants were asked to participate in a survey during the workshop sessions and the results, which will be briefly analysed in the next chapter, are clear indicators of several constraints that the project members still have to overcome in order to implement the use of TEL tools in an easier and more disseminated way.

Summing up, after the collection, development, evaluation and performance of both teaching methods and guidelines for the effective use of TEL tools, which represent outputs 1 and 2, a set of TEL tools concepts and case studies in combination with TEL methods will be suggested by the participants and analysed by the consortium members. These will also support the TEL methods and TEL Tools combination on a theoretical framework by reviewing literature in this area of study. This will be output 3. Output 4 aims at writing research papers, with the results of the survey in each country providing further insights into reasons why educators are hesitant to include TEL-based teaching methods into their daily teaching practice, suggesting the necessary changes.

All outputs combined and bearing in mind the improvements one can make when facing several constraints, described in more detail next, the ultimate goal is to merge experimented teaching methods with TEL tools. These results will be set out in the CoP.

4 Where are we heading to? – community of practice – achieved and expected results

With the notion of ‘The CoP’ we intend to create a useful and user-friendly pedagogical platform that allows the lecturers to have access to a wide variety of teaching methods combined with TEL tools.

The many-sided guidelines consist of innovative materials for different target groups, in a helpful and very practical way.

The goal is to make available an online platform where lecturers can find ideas and, eventually, ready-made solutions for their teaching practice and their teaching difficulties and anxieties. Based on a problem, and aiming at a specific goal, a method is applied, based on one or more TEL tools. Figure 5 gives illustrates this matrix-like combination. This set of previously tested methods and tools work when combined with one another. That is, “conceptual or mental maps”, such as “mind42com”, “cmap tools”, can be used in combination with the methods “generating ideas” or “brainstorming”.

TEL Methods and Tools	TEL TOOLS					
METHODS	Mental map or Conceptual map	MOOC	LMS virtual campus: e-learning b-learning m-learning	Learning Authoring Tool	WebPages online Creation	Webquest tools
Distance Learning (?)		Udemy.com Coursera.com Edx.com Udacity.com	Moodle Sakai Chamilo Atutor/Acontent Ogigno LMS Claroline Connect FormLMS	Reload editor eXe - e-learning XHTML editor Course Lab XERTE	WIX.com Webnode.com Wordpress.com	Inside Moodle or other LMS phpwebquest.org or other tools in Webquest.org
Brainstorming	mind42.com cmap tools MindMeister					
Generating Ideas	mind42.com cmap tools Mindomo					
Debate and Discussion groups						
Tutorials						
GroupWork						

Figure 5: Matrix combination method + TEL tool.

So far, the consortium has managed to comply with the established deadlines regarding the accomplishment of the different outputs. As such, and following the deadlines, tailored studies at each partner organization have been conducted, templates for the description of teaching methods and tools have already been devised and teaching methods and TEL tools have been collected.

Therefore, the collection of teaching methods combined with suitable tools is still in progress as well as the tailored existing research methods of the different institutions.

Up to now, more than 40 teaching methods (Figure 6) have already been identified. These can be used with TEL tools, namely Ten-Plus-Two, brainstorming, mental/conceptual mapping, debates or group discussion (task-based learning, Socratic), lectures, role plays, assessment work, tutorials, just to name a few.

Regarding the second output of the project – the CoP TEL Tools – (Figure 7) the same process has been applied. Therefore, several tools to be used in higher education with a specific purpose have been collected. These data included in the CoP allows the users to search, select and apply teaching tools framed on a method.

The third output – Case studies – is about a set of TEL tools concepts and case studies in combination with TEL methods so that these two support the final version of the CoP. Concurrently, review of literature was carried out by the project consortium members in order to provide the users a better understanding of the TEL methods and TEL Tools combinations within the scope of this project.

The fourth output of the project – Survey – intended to inquire both the members of the consortium, as well all the teachers participating in the workshops, on the different barriers regarding the use of ICT they face daily in their teaching practice. The results obtained in the survey allow us to better apprehend the constraints experienced by the teachers in higher education, providing useful and valuable data to be analysed and taken into account decision and policy makers of the consortium. The survey results shall also be more thoroughly analysed in forthcoming scientific publications.

We can, however, present here a short summary of the results obtained. In a more complete analysis of all the surveys carried out in the different European consortium countries, we managed to identify and highlight some important issues related to the implementation of our project, namely

The screenshot shows the AduLeT web application interface. At the top, there is a navigation menu with the following items: TEL Problems/User eXperiences, TEL Teaching Methods, TEL Tools, Administration, Register, and Log out. Below the navigation, the main heading is 'TEL Teaching Methods'. Underneath, there is a blue button labeled 'Create new TEL Teaching Method'. Below this button, there is a form with several dropdown menus: 'Subject' (set to '- Any -'), 'Duration' (set to '- Any -'), 'Setting' (set to '- Any -'), 'Assessment method' (set to '- Any -'), and 'Resources' (set to '- Any -'). An 'Apply' button is located to the right of the 'Resources' dropdown. Below the form, there is a table with the following rows and columns:

Task-based Learning	delete	edit
Online mindmapping	delete	edit
Online discussion	delete	edit
Brainstorming	delete	edit
Think-Pair-Share	delete	edit
Self assessment	delete	edit
Collection of student's expectations	delete	edit

Figure 6: TEL Teaching Methods.

barriers to the use of ICT, which reflect the answers of the survey the participants had to complete. The survey results and their organisation into clusters were obtained through the use of the group concept mapping (GCM) method which combines quantitative and qualitative approaches to collect and analyse a wide variety of data on the same subject, being able to reach a common view on an idea, in this case, on the TEL use problems in higher education

Overall, 104 higher education lecturers participated in the survey. On average, the participants have more than 20 years of experience in teaching, they come from different educational backgrounds as 47,1% of them come from the area of educational science, 14,7% from the area of social science and 20,6% from other non-specified areas. Only 17, 6% of the participants come from the area of computer science. This means that the majority of the participants lack the desirable level of expertise in using ICT. Regarding methodologies, the participants use different methodologies in their teaching, being face to face teaching the mode more generally adopted (67.9%) whilst distance/online learning was only used by 17,9% of the participants. Six main barriers have been identified, namely: lack of organization support, teachers' lack of knowledge and skills, lack of time, lack of hardware and software, students' lack of knowledge, skills and motivation, lack of reward and recognition. In fact, not knowing the most appropriate educational technology, lacking time for preparation and to know how tools work in real-life (classroom), the lack of proper equipment or software, having no or too little support with ICT problems that occur suddenly, students not having the motivation and the competencies to use ICT in an educational setting or even the fact that the quality of ICT use is not part of the internal teacher evaluation seem to be real barriers that worry teachers and might distance them from the more frequent use of ICT in their classroom.

These indications helped us to diagnose and rate the above mentioned barriers in terms of importance and difficulty to solve (Figure 8).

From what we can observe, lack of time stands out as the most important barrier but the easiest to be solved. Teachers' lack of knowledge and lack of organization support seem to lack an easier solution. Another aspect that stands out is the fact that both lack of recognition and reward were considered

AduLeT

TEL Problems/User eXperiences TEL Teaching Methods TEL Tools Administration Register Log out

Tools

Create new TEL Tool Create new TEL Tool Category

Category: Tool is best suitable for the following online environment: - Any -

Required technical skill level: - Any - Mode of teaching application: - Any -

Required equipment/devices/platform: - Any - [Apply](#)

Category	Tool	Clone tool	delete	edit
Groups in Social Networks	Google Forms	Clone tool	delete	edit
Groups in Social Networks	Linkedin Groups	Clone tool	delete	edit
Groups in Social Networks	Google Groups	Clone tool	delete	edit
Groups in Social Networks	Facebook groups	Clone tool	delete	edit
Online whiteboard	Iino	Clone tool	delete	edit
Video Conferencing	Skype	Clone tool	delete	edit
Mind map	Mindmeister	Clone tool	delete	edit

Figure 7: TEL Tools.

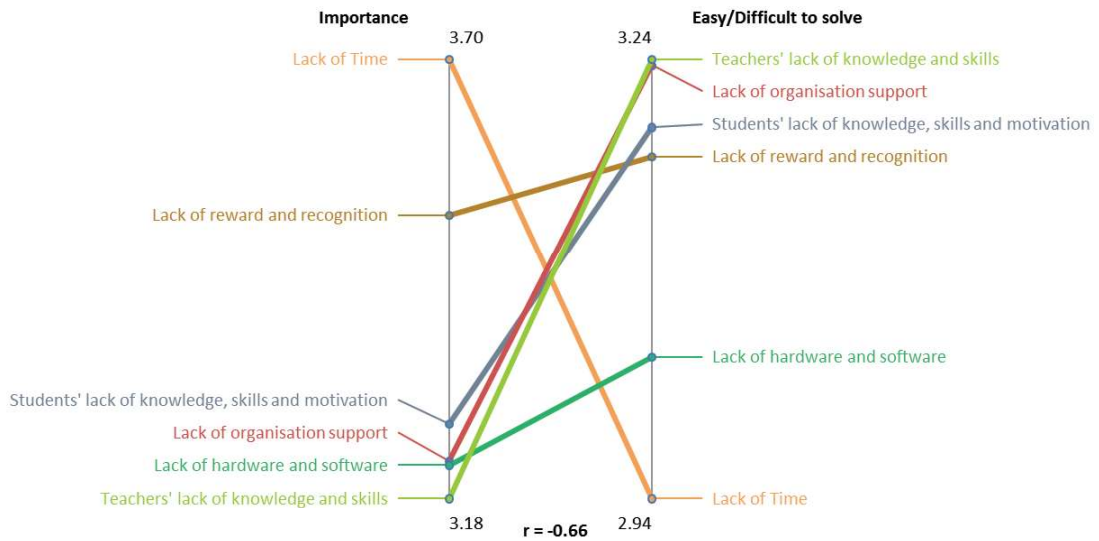


Figure 8: Clusters' comparison on Importance vs Easy/Difficult.

very important, but difficult to solve. Both have a great impact on the motivation of lecturers to use TEL in their teaching. Therefore, the project partners decided in a next step to search for solutions on how to cope with these barriers.

This study shows clear and rather conclusive evidence of real barriers and constraints to the use of ICT in the teaching practice. In addition, this study might also bring forward valid arguments for the introduction of the advanced technologies in higher education institutions.

The last output and more visible result of the project is the Community of Practice. It is still in progress and conjugates all outputs in a single platform (www.dev.adulet.eu), with already a considerable number of TEL methods and tools to be combined.

The CoP represents the crux of the AduLeT project as it is intended to be a public repository of best practices resorting to the use of advanced technology in higher education. Therefore, in this CoP higher education teaching staff can search for adequate teaching methods and learning through different filter options allowing them to understand which technologies to use in specific educational contexts.

Overall, the AduLeT project intends to provide the higher education academic community with teaching guidelines, best practice and pedagogical pathways which support an advanced use of learning technologies based on the individual studies of each partner and on the experience brought into the project by the collaborators in each country.

5 Conclusion

To conclude, it is our belief that AduLeT makes a valuable contribution to the state-of-the-art technological proposals in higher education as it conveys something innovative as well as tested teaching practices to this specific context. The fact that they have been tested and worked efficiently in a specific context and with a set of students does not mean that they can be applied in different contexts with different students. This is an aspect that future users of the CoP may not only test but also evaluate and provide feedback on.

We want to make clear that our intention is not to follow a dogmatic teaching approach, because as teachers we know that every year we have to adjust to several classes, diverse learning approaches, different students. Consequently, our teaching styles also suffer changes. We do not want to prescribe pedagogical solutions. Instead of prescriptive we want to be descriptive, adaptable and reflective. We want to highlight the importance of technological learning and, most of all, of collaborative work.

Taking into account the TEL settings and the students' learning styles and predisposition to work more and better with technological tools, we believe that we are creating a most valid CoP, involving the higher education academic community within the digital age and aiming to give contributions to the improvement of the pedagogical skills of each lecturer.

Considering the fluidity of digital technologies (Atherton, 2018), constantly and rapidly changing, the AduLeT project thus represents an added value to the studies on educational technologies conducted so far because, unlike some works that present a limited number of pedagogical solutions (Atherton, 2018; Duval, Sharples & Sutherland, 2016), it presents a significant number of methods combined with TEL tools. The CoP will undoubtedly adapt constantly and permanently to the new digital reality as new problems will arise and teachers can always upgrade different combinations of new methodologies with new TEL tools.

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