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Multimedia Teaching Contents: Creating and Integrating Activities in New Learning Environments

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1. Introduction

New technologies in addition to being one of the pillars of information and knowledge society are also an important factor of change in a cultural and social way and they are present in all stages of social life, businesses, public services, cultural activities and inevitably in Education and in the School. The changes that higher education has gone through, in particular and more recently with the Bologna process, are having consequences in the teaching/learning (T&L) process with particular focus on the contents and the way they relate to teachers and students.

The contribution of new technologies in this process of change at school, as well as its role in society, will be essential.

“Higher education is in the midst of transformative (but exciting) change. Over the next decade, the practices of teaching and learning will undergo fundamental change as universities and colleges respond to global, social, political, technological, and learning research trends. A duality of change – conceptual and technological – faces higher education”.

(Siemens, G., 2009)

Teachers have one more challenge in hands: seek to encourage more students to a new learning environment characterized by a breakdown of the increasing expectations of students compared to traditional practices of teaching and learning. We consider that the teacher by integrating new technologies in the T&L process will meet the conditions to improve the relationship with their students, engaging deeper in their learning. In this scenario, there is the need to adjust and adapt the format of learning content as well as the channel through which it is distributed, the proposed activities and assessment methodologies.

We face a new group of students, with a digital literacy which, sometimes, is higher than of their teachers.

“New technologies will not be tools to help the teacher but rather elements that need to be present during the daily school activities to, together with teachers, introduce new factors, creativity add-ons, in this new way of producing knowledge, teaching and learning”.

(Pretto, N., 2001)

Casting technologies consist of publishing audio content, video and picture on the Internet. This resource has been highlighted for its potential to generate richer learning scenarios, in distance learning or face to face modalities. This led us to carry this research and reflect on its potential exploitation in the context of T&L. These tools and technologies provide many possibilities for use/application in education, including the ability to have access to class contents anywhere and anytime and, in some cases, in open formats, and to enable the improvement and development of individual skills.

"Faced with a rapid development of knowledge is important that primary education by the acquisition of intellectual capacity needed to learn to learn throughout life, gathering information digitally stored, recombining it and using it to produce knowledge for the desired objective in every moment."

(Castells, M., 2004)

This integration of technology leads teachers to assume new roles and tasks at a professional level. Therefore, the teacher ceases to be just the one who teaches, but the one who co (learns) and drives the learning process.

"Teachers know that their work is changing, as well as the context in which they do it (...) The world rules are changing. It's time for the rules of teaching and work to change "

(Hargreaves, A., 1998)

Zhao (2007) stresses that the key factors leading to successful learning with technology are related with the knowledge that the teacher has of technology and its experience in using it.

This study is being conducted from a perspective of technology and services/tools in order to assess the educational impact of the use of emerging casting technologies in the context of T&L in higher education, focusing on the students and teachers capabilities, practices and expectations.

The various possibilities that lie ahead for emerging casting technologies in the classroom together with the lack of research studies that address this problematic, led us to carry out this study.

2. Aims and goals

This study tries to promote the use and integration of emerging casting technologies in the classroom and outside it, as tools to support the construction of educational content and as tools for building collective knowledge.

We also want to evaluate its integration not only as a support to classes but as a strategic option of the T&L process which may contribute, promote, encourage and motivate students to learn and improve their skills. We believe that the development of this study may promote the use of these technologies by teachers in the classroom but also in other places and contexts by students to carry out, as an example, broadcasting of events and/or the creation of an online TV channel for the school.

Therefore, the main goal of this study is:

To identify opportunities and practices for the teaching/learning process in higher education as a result of the integration of Podcasts, Vodcasts, and Screencasts and other emerging casting technologies.

It is intended to develop and achieve the following specific goals:

1. To access the expectations and beliefs teachers have about integrating casting technologies in the T&L process;
2. To test technology integration strategies and evaluate the practices that are generated by it;
3. To assess how the practices of using casting technologies are recognized/valued by teachers and students and to identify the improvements in the T&L process.

2.1 Characterization and use of casting technologies

Students and teachers roles in the school, namely in the classroom, are well established, traditionally it is expected that the teacher teaches and that the student learns. But the new approaches to T&L demand from students an active role in building their own learning which can be supported by the use of technologies. This challenges students, teachers and also the school to adopt new roles in a more student centred learning.

Among the technologies that can contribute to this change, casting technologies may act as means for the creation of new learning scenarios or as means to improve existing scenarios for more efficient T&L practices. This gains more importance when distance or blended-learning scenarios are at stake as (casting) content has the ability to contribute for the referred creation of new learning scenarios, adding time and place flexibility and contributing for collaborative learning practices.

We believe that the integration and use of casting technologies in schools may act as a positive ingredient for T&L and that the success of its application depends on the involvement of all actors. The goal *“to test technology integration strategies and evaluate the practices that are generated by it”* is strictly related with our choices about the technologies and tools to use in the current research, as we target to try different technological and pedagogical strategies and evaluate their impact in the T&L process.

The ease with which one can publish and edit podcasts or vodcasts has proven to be an important factor for the increasing integration in higher education contexts (Chan, A., & Lee, M.J., 2005; Boulos, M., et al, 2006; Chan, A., et al. 2006; Frydenberg, M., 2006). Several research projects have tried to understand this growth and the implications for T&L process (Edirisinha, P., et al, 2007; Guertin, L.A., et al, 2007; Lee, M.J. & Chan, A., 2007; Nathan, P., & Chan, A., 2007; Salmon, G., et al, 2007).

“Educators have also taken an interest in podcasting. Some have started broadcasting, such as at McMaster, where engineering professors now host an online show.”

“This approach to learning means that learning content is created and distributed in a very different manner. Rather than being composed, organized and packaged, e-learning content is syndicated, much like a blog post or podcast. It is aggregated by students, using their own personal RSS reader or some similar application. From there, it is remixed and repurposed with the student's own individual application in mind, the finished product being fed forward to become fodder for some other student's reading and use.”

(Downes, S. 2011)

The students' needs motivated by the technological changes along with the will of teachers to create alternative strategies in the context of their practice, has led more and more teachers to integrate them as a support tool in their classrooms.

"Rooted in emerging technologies which are often transparent to their users, podcasting in an academic setting has become an accepted one-way channel of communication between teacher and students, as faculty have seen the potential impact of creating podcasts of lectures and other course materials".

(Frydenberg, M., 2006)

Emerging casting technologies may turn out to be excellent teaching resources in different areas both at distance and local learning scenarios:

"Academics from many areas of education are showing interest in podcasting for education and the first results of research in this field point towards the benefits to learners".

(Edirisingha, P., et al, 2007)

"Each of the educator and learner tasks can be augmented through use of different technologies. For example, educators can provide a short lecture via a podcast, learners can respond to course materials through a blog post or through a short recording in a tool like Jing."

(Siemens, G., 2009)

For Siemens, podcasts can be used for teaching and learning to:

"Record lectures, include external presenters, evaluation and feedback, learner created reflections and interviews, interviews with notable contributors to a particular field, news or course-related updates and to short introductions to new subject areas".

(Siemens, G., 2009)

2.1.1 Podcast: Definition and concept

The term podcast is the result of the addition of the word iPod and broadcasting and its creation dates back to 2004 when its creator, DJ Adam Curry and Dave Winer decided to publish in the Internet their radio show. Although sometimes there is an indiscriminate use of terms, it is important to clear that the term podcasting refers to the act of publishing in the Internet while the term podcast refers to the content itself.

Concerning the format of the Podcast it can be audio, video or a combination of images and voice, which Edirisingha & Salmon (2008) refer to as "enhanced podcast". If the podcast includes video then is called vodcast or vidcast (Salmon, G., & Edirisingha, P., 2008). When the video content refers to screen captures along with vocal descriptions it is called screencast. This type of casting is particularly relevant for demonstrations on how to use software. Once produced, the podcast can be reused in different contexts and for different audiences. From the perspective of the student, podcasts can be heard or seen, "when and where you want" (Carvalho, A.A., 2008).

Kaplan-Leiserson (2005) also states that some students prefer to listen instead of reading. To Steizinger (2006) podcasts may help in creating a social presence and according to

Salmon et al (2007) it may help teachers and students to reinforce ties and improve their relations.

3. Podcasts and vodcasts in higher education in Portugal and the world: Local input and experiences

There are already several universities that recognize the potential of podcasts and have integrated them mainly because they consider that the fact that the students listen to their MP3 players is an asset.

Thus, some universities even provide their freshmen iPods (Kaplan-Leiserson, E., 2005) in order to benefit from the fact that some teachers record their classes to subsequently make it available online (Frydenberg, R.N, 2006; Guertin , L.A. et al, 2007).

In the next section we present a review of some key studies on the use and integration of podcasts and other forms of casting. These studies are organized accordingly to subject areas, uses or levels of education.

Studies about content production by academics:

- Kingston University (United Kingdom)

In the Kingston University podcasts were used in two courses: English Language and Communication and Earth Sciences and Geography. In the first case the podcasts were intended to support students in the tasks of creating portfolios and presentations and had a non-binding character. In the class of Earth Sciences and Geography the podcasts were used to address key dataterms during class and to make an introduction to the next lesson with the teacher recording the classes so the students can review them (Edirisingha, P., C. Rizzi, & L. Rothwell, 2007).

- University of Leicester (United Kingdom)

The university did a study of the podcasts in two classes: fiber optics communication systems and genetics. In the first course podcasts served to guide students in the activities held during the week (Edirisingha et al, 2007) and in genetics the students created podcasts related to ethical issues in genetics.

- University of Nottingham (United Kingdom)

They conducted a study that integrated ten case studies in five universities (Salmon et al, 2007). The authors concluded that students have difficulty using their MP3 players and heard podcasts and saw or heard vodcasts mainly if they were required in the course.

- University of Leicester (United Kingdom)

The study presents and describes 12 experiments performed using podcasting in higher education (Edirisingha, P. & Nie, M. 2008).

- Carrick Institute for Learning and Teaching in Higher Education (Australia)

"Questioning the net generation: a collaborative project in Australian higher education", describes a project that sought to identify how the tools supported by technologies of a new

generation can be used successfully in higher education (Kennedy, G., Krause, K.-L., Gray, K., Judd, T., Bennett, S., Maton, K., Dalgarno, & B. Bishop, A., 2006).

Studies about content production in secondary levels:

- University of Minho (Portugal)

The project "Correspondance Solaire" took place in 2005-2006 involving the teaching of French and the eTwinning project. It carried several activities involving Portuguese and Belgian students in an online space using a forum, blog, wiki, chat and podcasts (Moura & Carvalho, 2006a).

- University of Minho (Portugal)

The study, "The Use of Podcasts in Education and Learning Sciences: a study with students from 9th grade on topics of the Human Body/Health," focused on the use of podcasts in the natural sciences. The students used nine podcasts about contraceptive methods and two related to the theme of the cardiovascular system (Carvalho, J. 2009).

- University of Minho (Portugal)

In the study presented by Moura & Carvalho (2006b), students had access to class related recordings in Podomatic and could hear them whenever they wanted, according to their pace and learning needs. Working students, with difficulties in attending all classes, saw a chance in podcasts to hear the contents given in their absence.

- University of Minho (Portugal)

In the project "Podcast: A Powerful web tool for learning history" students listened to an activity proposed by the teacher to undertake the course of history and, subsequently, they were asked to produce their podcasts, in pairs, on the curricula they were studying (Cruz, S. & Carvalho, A.A., 2007).

- Duquesne University (USA) and Allegheny Singer Research Institute - Center for Genomic Studies (USA)

This US project aimed specifically to understand the use and development of podcasts by students and its impacts on learning in a science class (Piecka, D., Studnicki, & Zuckerman-Parker, M. 2008).

- University of Gloucestershire (UK)

In the study carried out in this University podcasts had duration of 10 minutes and were aimed at making a first approach regarding the environment and sustainability as well as help students improve their study skills.

Final notes:

The most widely used type of podcasting in higher education, as Evans reports (2007) has been recorded lectures. MIT, Stanford and other universities have regular practices of making available their lectures. In b-learning and e-learning scenarios podcasts can provide several advantages and be an asset in the T&L process. Some universities use podcasts in these flexible learning scenarios like: Charles Sturt University - Australia (Chan, A., & Lee,

M., 2005; Chan, A. et al, 2006; Lee, M., & Chang, A., 2007; Nathan P . & Chan, A., 2007 or University of Minho (Carvalho, A.A., 2008).

4. Research methodology

As previously referred, this study tries to promote the use and integration of emerging casting technologies. It is being carried at the School of Technology and Management of Lamago - Polytechnic Institute of Viseu - Portugal. The study is structured accordingly to an action research methodology.

In the current study students have been gradually exposed to various types of content according to its technical complexity and novelty and in the following order: 1º: audio podcasts, 2º: vodcasts and screencasts and in a future research cycle, yet to be carried, broadcasting (live TV).

In addition to this gradual introduction of different type of multimedia content, it is our purpose, in the next research cycle, to adopt strategies for the use of casting tools outside the T&L context, including its application in the support of some institutional services.

The action research methodology, adopted in this study, is characterized for its spiral approach, always focusing on a problem and interactively alternating between action and critical reflection.

Dick, B. (1999) argues: "The methods, data and interpretation are refined in later cycles, continuously based on experience and knowledge achieved in the previous cycle". Several authors consider Kurt Lewin, a social psychologist and educator who developed his work in action research in the United States of America in the 40s, the pioneer in this methodology.



Fig. 1. Action-Research according to Kurt Lewin (*adaptation*).

One of these authors, Esteves (1986), classifies action-research as a "realistic action always followed by a self-critical reflection, and an evaluation of the gathered results sustained in a triangle action research and learning".

For data collection and analysis, this study adopted questionnaires, interviews with users and teachers, gathered statistics (from the supporting web sites) and will perform qualitative evaluation of the content that is produced.

4.1 Target audience and phases of the study

This research, applied in the undergraduate School of Technology and Management of Lamego, involves the researcher as coordinator of the multimedia division, teachers and students from the same institution.

The study is structured in different stages as follows:

- Step 1:** The first step was focused in the literature review on the area.
- Step 2:** The second stage was focused in the analysis and evaluation of the most adequate technologies to be adopted in the study. For this purpose a benchmarking grid was created and used.
- The selected tools were then tested before the following stage of development.
- Step 3:** The stage were the strategy and planning for the integration of the tools was defined.
- Step 4:** This stage is focused in the production of the multimedia content.
- The content is being produced in a first step by the researcher and it is focused on the use/explanation of the various technologies involved. The goal is that students and teachers gradually learn how to create their own podcasts and learn it through the use of podcasts and vodcasts. For the publication of these casting content, a on-line platform was created, supported by Grouply, at: <http://estgl-criar-aprender-partilhar.grouply.com/>



Fig. 2. Main Page of Community:” estgl_criar_aprender e partilhar”

- Step 5:** This phase consists of the field work, namely providing the casting content in a gradual way, along with the evaluation in each sub-step.
- Step 6:** This phase will be targeted at processing and analysing the collected data.
- Step 7:** Finally, the study results will be inferred.

5. About the different tools and technologies being adopted

The study aims to promote the use of emerging casting technologies as enablers for the production of educational content and collective knowledge, not only in the context of the classroom by the teacher but also in other initiatives carried by the students. One of the aims of the study is that students and teachers create their own multimedia content, so we had to take into consideration when choosing the tools to use that most of them do not have high

computer literacy. For choosing the tools to be used in the study we defined the following characteristics as demanding:

- Open source: free to use based on open technologies;
- Intuitive, practical and functional;
- Easy to setup.

In the next section we will present the tools selected.

5.1 Choosing the tools to produce podcasts (audio)

For the production of audio castings (podcasts) the following tools were analysed and compared: Audacity, Sony Sound Forge and Adobe Audition. The decision went to Audacity.

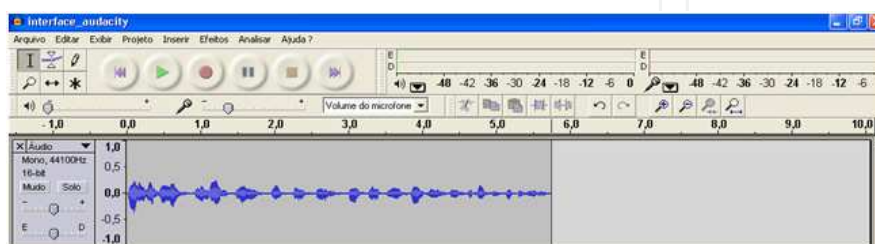


Fig. 3. The Audacity Interface

Choosing Audacity was based on its features and advantages over the others, namely: the fact that it is open source, free to use, easy to configure along with the integration of the usual tools of professional software.

5.2 Choosing the tools to produce vodcasts and screencasts

For the creation of screencasts and vodcasts the analysis was made on three tools: Jing, Camtasia Studio 6.0.3 and Screentoaster. After analysing the characteristics and capabilities of each of the tools Jing was the chosen one for being open source, easy to use, with the ability to capture, edit and share the content.



Fig. 4. Homepage of Jing

5.3 Choosing the tools for broadcasting

Regarding the tools for Broadcasting we chose to analyse and compare three: Livestream +Procaster, Stickam and Ustream.tv. This choice took also into account the popularity of the tool, an indicator that minimizes the risk of discontinuation of the service.

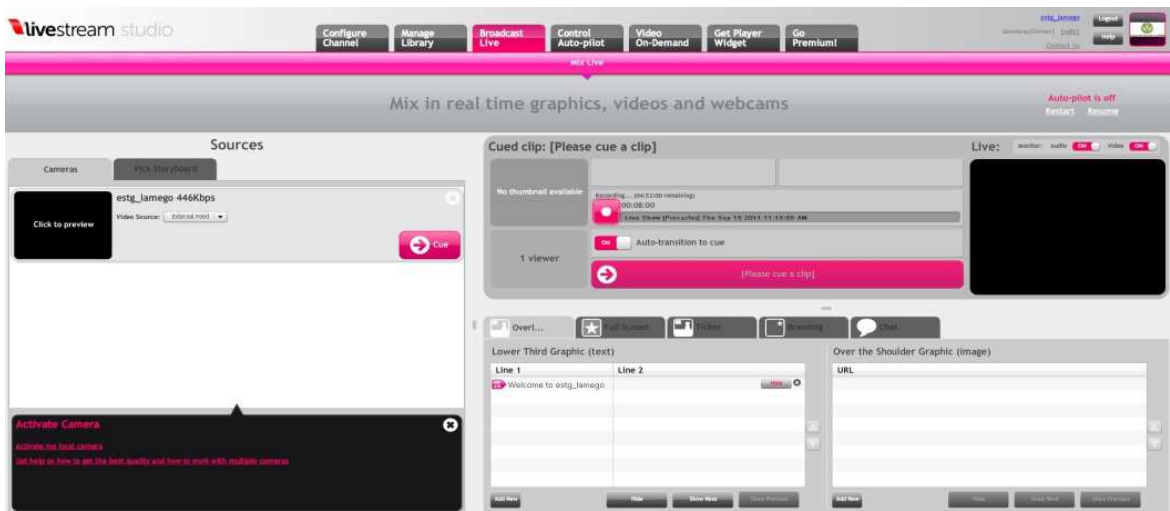


Fig. 5. Interface of Livestream/Procaster – Studio

The chosen one was Livestream+Procaster a more complete solution when compared to Ustream.tv and Stickam, including features such as the availability of an interactive on-line studio and the flexibility of the broadcasting tools that allows to adapt to different needs like classes, conferences or workshops.

5.4 Choosing the tools for content aggregation

All tools are relevant, with advantages and disadvantages as well as distinct features that correspond to different situations. The importance they have depends on the use and context the user wants to do with them.

To select a platform for aggregating multimedia content we also produced a table for a comparative analysis which included: Ning, Elgg, Moodle, Facebook and Grouply. The choice was toward the last one: Grouply.



Fig. 6. One of the Groups created on “estgl_criar_aprender e partilhar”: Upload multimedia content

The Grouply platform has advantages such as the fact that it is intuitive to use, very functional and allows to set different graphic templates. On the other hand, Ning platform is not free and Moodle is difficult to configure, and has limited support for Web 2.0 features.

6. Preliminary results

As preliminary results we can point out the curiosity and motivation, either from teachers or students to produce and integrate various types of multimedia content in their courses.

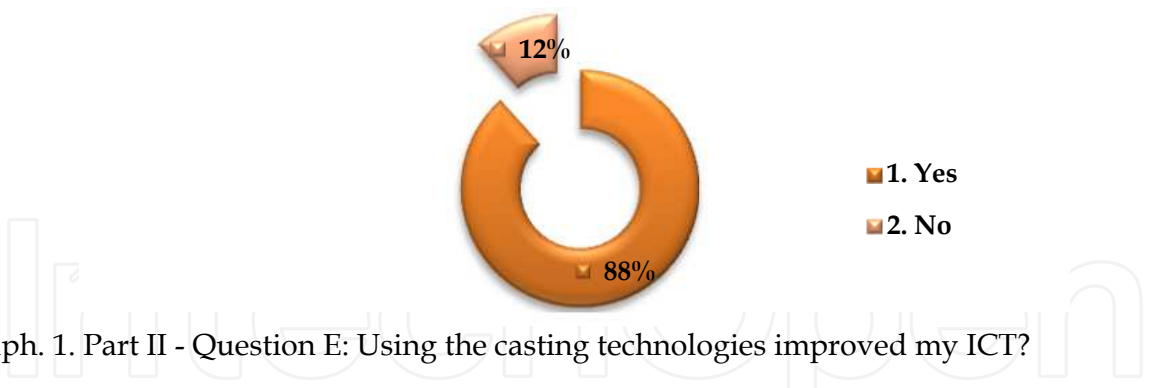
The study involved, so far, and during the school year of 2010-2011, the participation of a majority of the undergraduate courses available at the school, namely: Tourism Information (1st, 2nd and 3rd years), Tourism, Cultural and Heritage Management (1st and 2nd years), Accounting and Auditing (2nd year), Accounting and Auditing – evening course (1st year), Administration Secretariat – evening course (2nd year), Management and Computer Sciences (1st and 2nd years) and a group of Erasmus students. It involved also several teachers who gave their contribution. It is also expected that during the current school year 2011-2012 an increase in the participation and collaboration of teachers.

To evaluate the opinions of teachers and students about their use of casting technologies, a questionnaire was released on-line (in Google Docs). The process of data collection is still taking place during the preparation of the chapter, but we can indicate some preliminary data on the basis of one hundred percent of teachers who responded and in the universe of two hundred seventy-six students responded one hundred seventy-for.

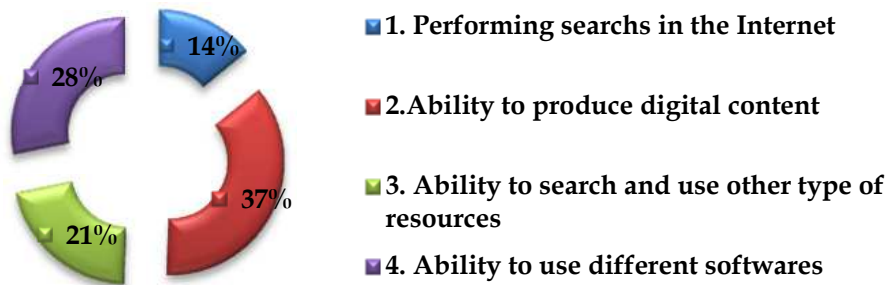
6.1 The students' opinion

About the development of skills in multimedia content creation and present/future use:

Students considered having an increase in their skills to produce digital resources (e.g. documents, presentations, audio podcasts, video podcasts, screencasts, vodcasts, etc.) as shown in graphic 1.



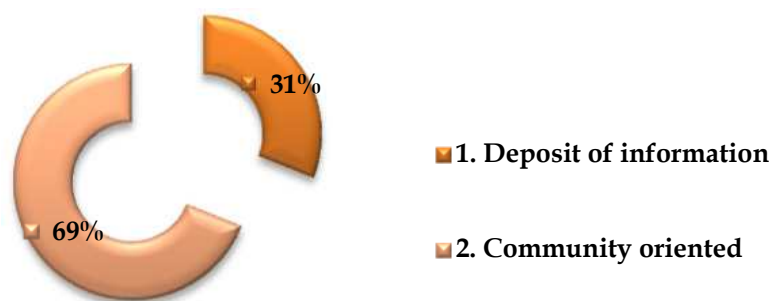
Graph. 1. Part II - Question E: Using the casting technologies improved my ICT?



Graph. 2. Part II - Question F: *If so, in what area(s)?*

- Ability to use different types of software with varied functions (Audacity, Jing, YouTube, AuthorStream, Prezi, etc.):

When asked if the casting technologies and content could be an improvement to the classes 98% referred yes. As referred an on-line community portal was built to support the dissemination of the produced content. Considering its uses, the students were asked if they preferred that the portal acted more as a deposit of information or as a space for sharing experiences and discussions on the use of casting content. Graphic 3 shows that the majority preferred the discussion and interactive format.



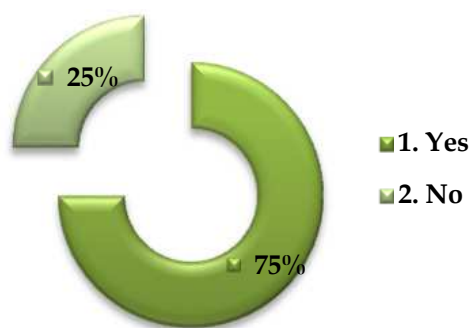
Graph. 3. Part III – Question E: What is the preferred role for the portal "estgl_criar_aprender e partilhar": a) deposit of information; b) community oriented.

Considering the willingness to publish content in the portal, 84% referred that they will do it in the future and 95% referred the expectation to get more content from this community.

6.2 The teachers' opinion

Skills development of multimedia content creation and present/future use:

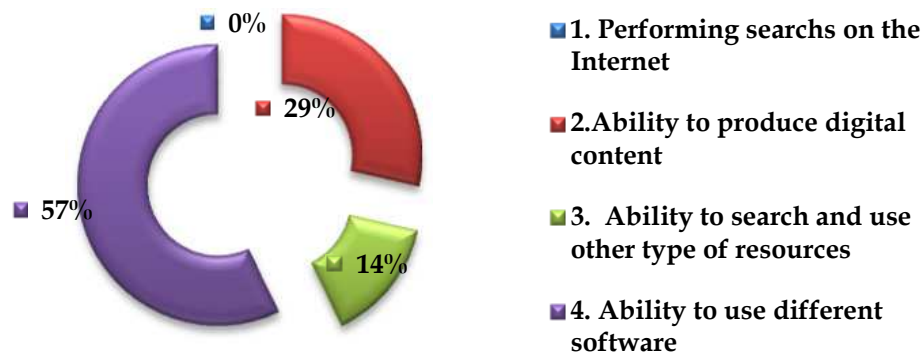
- Increased production skills of digital resources (eg. documents, presentations, audio podcasts, video podcasts, screencasts, vodcasts, etc.):



Graph. 4. Part II – Question E: Using casting technologies the ICT competences get better?

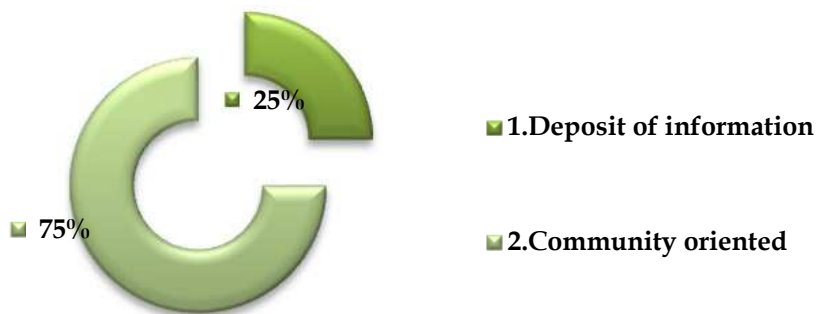
- Ability to use different types of software with varied functions (Audacity, Jing, YouTube, AuthorStream, Prezi, etc.):

Considering the willingness to use, create and publish content in the portal, 100% responded yes.



Graph. 5. Part II – Question F: *If so, in what area(s)?*

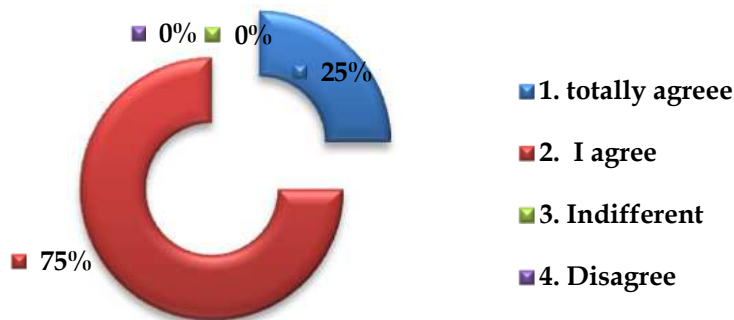
- Preference in the Community "estgl_criar_aprender and share" to have more support for discussions/interactions of the class that are taken in the context of classroom or other platforms such as Moodle over an optical function more content repository:



Graph. 6. Part III – Question E: What is the preferred role for the portal "estgl_criar_aprender e partilhar": a) deposit of information; b) community oriented.

About the ability for the teachers to get multimedia content and casting supporting software for their classes in the portal, all referred the support for this initiative.

Finally considering the perceived impact of using multimedia/casting technologies in the classed all teachers referred that it had a positive effect on student’s motivation in the classes (Graphic 7).



Graph. 7. Part IV – Question M: Using technologies in my class got an extra motivation for the students?

They all agreed that the “*estgl_criar_aprender e partilhar*” community played an important role of the positive feedback of students:

7. Conclusions

The development of this project includes several stages and a constant adaptation according with the gathered and perceived results. Some important stages are already concluded but others remain active, like the field work. Nevertheless, we were able to gather some results that indicate positive feedback from teachers and students.

All they perceive the relevance for classes of introducing casting content and technologies. These preliminary results obtained allow us to face the next steps of the study with optimism.

8. Future work

Some of the work is still to be carried, namely the full evaluation of students and teachers practices and opinions concerning the use of casting technologies. This will provide us with a better understanding of the impact of these tools in the T&L process.

As future work for this project, in order to increase its positive impact, we aim to increase the number of members of the community involved – teachers and students – by providing increasing the awareness towards the project along with better technical and human support that may allow more activities for the creation, development and sharing of multimedia content in their classes, ultimately targeted at providing a better T&L process.

All the activities being carried are aimed to promote the use of these technologies not only in the classes but also in other extra-curricular activities. We aim to provide conditions to the creation and development of an on-line TV channel for the institution that will allow the dissemination of the activities and events carried in the institution.

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Interactive multimedia is clearly a field of fundamental research, social, educational and economical importance, as it combines multiple disciplines for the development of multimedia systems that are capable to sense the environment and dynamically process, edit, adjust or generate new content. For this purpose, ideas, theories, methodologies and inventions are combined in order to form novel applications and systems. This book presents novel scientific research, proven methodologies and interdisciplinary case studies that exhibit advances under Interfaces and Interaction, Interactive Multimedia Learning, Teaching and Competence Diagnosis Systems, Interactive TV, Film and Multimedia Production and Video Processing. The chapters selected for this volume offer new perspectives in terms of strategies, tested practices and solutions that, beyond describing the state-of-the-art, may be utilised as a solid basis for the development of new interactive systems and applications.

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