A Video Competition to Promote Informal Engagement with Pedagogical Topics in a School Community

José Alberto Lencastre[1], Clara Coutinho[1], Sara Cruz[1], Celestino Magalhães[1], João Casal[2], Rui José[2], Gill Clough[3] and Anne Adams[3]

[1]*Institute of Education, University of Minho, Campus de Gualtar, 4710-057 Braga, Portugal*
[2]*Centro Algoritmi, University of Minho, Campus de Azurém, 4800-058 Guimarães, Portugal*
[3]*Institute of Educational Technology, Open University, Walton Hall, Milton Keynes, MK7 6AA, U.K.*

Keywords: Videos, Public Display System, Technology-enhanced Learning.

Abstract: This paper presents a study developed in the scope of a larger project that aims to understand how video editing and content sharing in public displays can be used at schools to promote the informal engagement of students with curricular contents that are essential to foster future learning. The study involved a video competition where students were invited to create videos around specific pedagogical topics. These videos were subsequently presented in the public display at the school, and students could use a mobile application to rate, create comments or just bookmark the videos. Findings suggest that students are receptive to creating videos and sharing them in public displays. However, the results also show that few students that used the application to interact with the content. Many reasons for this are presented such as unawareness that the display is interactive 'because it seems like a regular TV', too small a number of interesting videos shown during the video contest. Particular barriers included not owning a mobile device capable of interacting, and the limitation of the large screen which does not allow searching 'the videos we like', as YouTube seems to do.

1 INTRODUCTION

Video is becoming increasingly important as a learning technology. The use of video as a pedagogical resource has been shown to achieve significant pedagogical results. It is seen as playing an important role in the educational process by allowing the teacher to diversify teaching practices (Jordan, 2012). In this work, we also address the pedagogical use of video, but we focus on the broader role that video creation and presentation can have to promote curiosity and engagement with pedagogical topics. As suggested by Goodyear (2011), there is a shift in our sense of the spaces and contexts in which education takes place, as different learning activities are becoming more commonly distributed across a variety of contexts. We focus on the boundary between the video as a pedagogical and creative performance for the author and the video as a social object for the educational community.

Our study is part of an on-going research project, called JuxtaLearn, which aims to promote students' curiosity in science and technology through creative filmmaking, collaborative editing activities, and content sharing. The idea is to identify their learning difficulties or 'threshold concepts', *i.e.* concepts that constitute major learning barriers, and facilitate the learners understanding through the creation and sharing of explanatory videos. Meyer and Land (2003) describe 'threshold concepts' as a barrier to comprehension that once overcome opens a new knowledge about the subject. The JuxtaLearn process uses the collaborative video editing and sharing to foster students' curiosity in 'tricky topics', helping them to move towards a deeper understanding (Adams et al., 2013). We will refer to these topics as 'tricky topics', as this was the term used during the work with teachers. These videos, together with additional data, such as quizzes, and the subsequent engagement with viewers is what we call a video performance. Digital displays in the public space of school can play an important role as a medium for informal learning by extending those video performances to a new learning context, promoting curiosity with the videos and their content

Lencastre J., Coutinho C., Cruz S., Magalhães C., Casal J., José R., Clough G. and Adams A..
A Video Competition to Promote Informal Engagement with Pedagogical Topics in a School Community.
DOI: 10.5220/0005450403340340
In *Proceedings of the 7th International Conference on Computer Supported Education* (CSEDU-2015), pages 334-340
ISBN: 978-989-758-107-6

(Otero et al., 2013), fostering discussion around those topics. According to Lencastre, Coutinho, Casal and José (2014a,b,c), public displays in an educational context can be a simple and effective way to generate shared experiences in schools. Being interactive displays, the screens can be used to promote students' curiosity about the content, favouring the process of learning the content presented on the screen.

In this work, we report on a study that aimed to understand the extent to which the presentation of locally sourced pedagogical videos on a public display at a communal space of the school is able to promote engagement around the videos and the topics they represent. The goals that guided the research project were formulated as follows: i) To understand the pedagogical relevance of the video creation process; ii) To foster student's curiosity in complex concepts through educational videos, iii) To generate a collection of videos that can be shared on the public display in order to study the mechanisms of interaction with the platform.

The study involved a video competition where students were invited to create videos around specific 'tricky topics'. These videos were subsequently presented in the public displays and students could use a mobile application to rate, create comments or simply bookmark them.

2 RELATED WORK

The use of video as a pedagogical resource in school is not new and has been used with proven results (Jordan, 2012). The video may play an important role in the educational process as it allows the student to have participatory role, a more engaging learning, and facilitating the acquisition of knowledge. An example is YouTube that has a high potential to improve the quality of the reflection in the classroom (Bell, 2013; Caetano and Falkembach, 2007), and can increase the enthusiasm and students' motivation (Heitink et al., 2012), through more efficient understanding (Khalid and Muhammad, 2012).

Interaction with public displays is mostly expected to occur as part of a public setting where many people may be present, typically carrying out multiple activities and having their own goals and context. Therefore, for interaction to occur, the display must be able to attract and manage people's attention. However, engaging users with interactive public displays is known to be a challenging task. Brignull and Rogers (2003) reported that 'a major problem that has been observed with this new form of public interaction is the resistance by the public to participate'. Kukka, Oja, Kostakos, Gonçalves, and Ojala (2013) studied how this barrier to interaction (the 'first click'), can be overcome. Previous research has also identified the display blindness effect (Müller et al., 2009), where people look at the display, but do not see its content. Based on previous experiences that created the expectation that content is not relevant, people just learn to filter it. Müller, Wilmsmann, Exeler, Buzeck, Schmidt, Jay and Krüger (2009) pointed out that the majority of users only look at the displays if they have the expectation of seeing relevant content. The fear of looking silly while interacting with the display, especially in gestural interfaces, has also been pointed out as another barrier to interaction (Brignull and Rogers, 2003). Müller, Walter, Bailly, Nischt, and Alt (2012) also explore the issue of noticing the display interactivity as other barrier for interaction.

In the specific study presented in this paper the strategy to seed the system with locally relevant videos, consisted in the promotion of a pedagogical video competition where students created a number of videos across different scientific areas. The goal was to overcome the display blindness effect (Müller et al., 2009) by offering users content that they could more easily identify with and thus perceive as more relevant. To allow users to notice interactivity (Müller et al., 2012), we created informative digital posters that were being exhibited on the display regularly. The posters have also been posted on the schools' institutional Facebook.

Besides the best educational video award, and in order to raise the interaction with the public display, another prize was given to the video that generated the most interaction.

3 METHOD

This study was strongly anchored on the video competition that took place in a secondary school in Portugal. The study also included the identification of 'tricky topics' with teachers and the public presentation of the videos in the communal space of the school.

Different methods were applied in order to collect the data: (i) semi-structured interviews with teachers from different departments, (ii) system logs on the platform, (iii) a diary to collect direct observations, (iv) a grid to evaluate the pedagogical relevance of the videos, and (v) a group interview with the students to get a qualitative assessment and

to understand their perceptions about the whole process.

3.1 Participants

Thirteen teachers of a public school (9 females and 4 males) participated in this study. A total of 44 students (ages between 16 and 18) from different school years took part in this event in a total of 22 teams. Other ten participating teachers from different curricular subjects accompanied the teams during the video creation process (scientific mentors). The video contest jury consisted of eight schoolteachers, one from each of the subject areas of the submitted videos, one member from the school board, and a member from the University of Minho team.

3.2 Identifying the 'Tricky Topics'

The first step in the research process was the identification by the teachers of the pedagogical topics that could serve as themes for the videos. These were expected to be 'tricky topics' that represented key learning barriers within the respective subjects. To identify 'tricky topics', we conducted thirteen semi-structured interviews with teachers from several departments (e.g., Mathematics, Biology, Chemistry, ICT, Portuguese, English, Arts, History, Geography, Philosophy) with the following open questions: (1) which 'tricky topics' do students usually have difficulties with? (2) What reasons lead the student to have these difficulties? and (3) What teaching strategies do teachers use to help students overcome these difficulties?

Each interview lasted approximately 15-20 minutes and was audio recorded and transcribed. Later, a content analysis was carried out following the guidelines of Bardin (2013). The goal was to extract information on the 'tricky topics', and associated 'stumbling blocks', that teachers considered complex for students. The collected 'tricky topics' were then used as the list of possible themes that the students could choose to create their videos.

The thirteen interviews generated fifty-eight 'tricky topics'. These topics formed the themes that the students could choose to create the videos. From the 44 students initially enrolled only 23 (ten girls and thirteen boys, forming ten groups) submitted videos to the contest.

3.3 Running the Video Competition

With the themes list ready, the video competition was then announced through multiple channels: flyers, student's institutional email, an official website, Facebook, School's YouTube channel, regular 'teasers'. The competition process involved three main steps: (1) enrolment in the video contest; (2) video making; and (3) presentation of the videos in the public display at the school.

To register for the video competition, students could fill an online questionnaire, where they described their group (name, contact details, class and year) and the theme they had selected for their video. Students were then expected to go through the process of storyboarding, filming and composing a video performance that expresses their understanding of the 'tricky topic'. Especially during the storyboard phase, they were supposed to interact with their scientific mentor to assure the scientific validity of their video. All submitted videos had to be associated with at least one scientific mentor. A questionnaire was fulfilled by these mentors who monitored the groups in the video creation process in order to obtain information on three main issues: (i) if the video is scientifically correct, (ii) if it has pedagogical potential, and (iii) if the teacher would use the video in his own classes. This survey included 'closed' response items, by using a Likert scale with five points (from 1 = 'Strongly disagree' to 5 = 'Strongly agree').

The videos submitted to the competition were judged according to the following criteria: 50% for pedagogical quality and potential to promote understanding of the represented topic, and 50% for multimedia quality, originality and potential to generate curiosity. Three awards were given: 1) best video award; 2) second video award, and 3) the video with the most interactions generated at the school's public display.

3.4 Public Presentation of the Videos

The videos submitted to this competition were publically presented to the entire school community through a public display in the communal space of the school. Our main interest was to analyse the level of engagement and to measure the levels of interactivity with the displayed videos. Thus, the location of the display was selected in order to capture students' attention, as this is a space where they hang around during breaks (see Figure 1).

The room is also a place that most students need to walk through as they go to or return from classes,

as it is near the cafeteria.

Figure 1: Public display at the communal space of the school, near the cafeteria.

The public display used for this study includes a display application that renders the videos published by students and shows some additional information about them. In the space between videos, the audience is informed about which video was shown last and which are to be shown next. The application also displays metadata associated with the videos like title, author, rating and number of votes (see Figure 2).

Figure 2: Screen of the public display used for this study.

Students were encouraged to engage with the videos through the JuxtaLearn mobile app. This is part of a discussion step in which several mechanisms are applied to engage user participation and commenting with the goal of augmenting the reflective facet of the JuxtaLearn process.

The mobile application shows a content stream with information about the recently presented videos, giving users easy access to rate, comment or simply access the video on YouTube. The rate feature allows users to classify the videos. The comment feature is to enable viewers to let the video authors know what they think about their video

Figure 3: Mobile application.

creation. The feature 'Know more' leads the user to the YouTube page of the video, which allows personal viewing of the content or access related videos about the same issue.

The application on the display frequently shows information about how to download and use the mobile application, incentivizing people to it.

In addition to the videos, at regular intervals, the display system also runs other applications that show school information, like news or photos of events.

The use of the mobile app generated metrics to assess the different aspects of the system usage.

4 RESULTS

4.1 Video Creation Process

The submitted videos to the educational video contest approached the following 'tricky topics': (i) behavior of the function near the asymptote (Mathematics), (ii) asexual reproduction (Biology), (iii) evolution (Biology), (iv) preconception

(Philosophy), (v) matrices and vectors (Technology, programming), (vi) robotics (Technology, programming), (vii) freedom (History), (viii) democracy (Philosophy), (ix) asking questions (English), and (x) starting a corporate (Secretariat).

All groups have indicated a scientific mentor, except one group that was disqualified. According to these teachers, all the nine videos submitted to the contest are scientifically correct, have pedagogical potential and therefore could be used in their classrooms (see Table 1). This survey included 'closed' response items, by using a Likert scale with five points (from 1 = 'Strongly disagree' to 5 = 'Strongly agree').

Table 1: Teachers' opinion about the videos.

Subject	Themes / 'tricky topic'	Scientifically correct	Pedagogical potential	Could be used in the classrooms
Mathematic	Behavior of the function near the asymptote	4	4	4
Biology	Evolution	5	5	5
Biology	Asexual reproduction	5	5	5
Technology	Matrices and vectors	4	4	4
History	Freedom	5	5	5
Philosophy	Preconception	5	5	5
Technology	Robotics	4	4	3
English	Asking questions	5	5	5
Secretariat	Starting a corporate	4	4	4

Simultaneously the jury panel made the videos' assessment. The following links point to the awarded videos:

- Best video award: http://youtu.be/Hbx6p_uxVQA
- Video with more interactions with the public display: https://www.youtube.com/watch?v=61qqwT1Bk7M

4.2 Analysis of the Awarded Videos

4.2.1 Best Video

The video 'asexual reproduction' (Biology) begins by explaining that reproduction is essential for the maintenance of species, once the new beings arise from other living creatures through mitoses. The images show that the beings that arise by asexual reproduction are genetically identical to each other.

The video continues illustrating the process of asexual reproduction in different types of unicellular organisms, although it may also occur in some multicellular organisms. Then the video shows similarities and differences between the various cases of asexual reproduction.

From a pedagogical point of view, in the opinion of the evaluators, the video allows viewers to assess the implications of asexual reproduction in terms of variability and survival of populations. Through the created scenario, it is possible to understand the hermaphroditism as a condition that does not involve self-fertilization.

4.2.2 Video with More Interactions with the Public Display: 'Preconception'

The video with more interactions with the public display (36% of the total interactions) addresses the thematic of 'preconception' (Philosophy). The actors are students of the school's theatre group.

The video begins with the presentation of the main characters: a class of the school and the arrival of a new student. Next, various situations of bullying with the new student are staged: discussions, beatings and humiliation. In response, the new student reacts with revolt, despair, and aggression.

Finally, the revenge, the new student fires a gun at one of the aggressors. The film continues with the attempted suicide of the main character and concludes with the awareness of the wrongful act from one of the attackers and the attacked.

According to the evaluators, the video has potential for portraying authentic situations that can be pedagogically framed in different disciplines and school years. The actors gave credibility to the performance, aspect highlighted by the jury. The images are powerful and could be real. By having students known to their peers, the video has enormous potential to address 'bullying'.

4.3 Interaction with the Videos

Regarding the logs recorded on the system, the following results were obtained:

- 20 distinct users signed up (19 of which interacted with videos);
- 94 interactions with videos were registered;
- 2 distinct users wanted to know more about videos;
- In 9 videos, users followed the YouTube link in order to see them again or to watch related videos.

Table 2 lists the interactions per type of production or type of content, giving insights about which are the video performances that foster more curiosity.

Table 2: Number of interactions per type of video performance.

Type of production	# of interactions	% of interactions
Students performance	59	62,8
Scenes shot on own city	13	13,8
Content presentation	9	9,6
Based on web resources (ex: personas talking)	5	5,3
Video tutorial alike	3	3,2
Other (ex: video contest advertisement)	5	5,3
Total	94	100

4.4 Data Obtained from the Diary and Group Interview

Some teams have not submitted the videos, others didn't involve the scientific mentor, which affected the depth of the addressed concepts, and others failed to explain the 'tricky topic' through images, resigning from the video competition.

Generically, students had heard about the video competition but did not link that with the videos shown on the public display.

The students that participated saw the videos on the public display because 'I know that my video is being exhibited there'.

Students didn't know that the display was interactive because 'the display seems just a regular TV' and 'on my previous school existed TVs always displaying stuff and people ignored them'. Regarding the interaction mechanism implemented, students stated that: using the smartphone to interact 'it is a good bet' because nowadays everything can be done through smartphone. However, it should allow other forms of interaction for those that do not have smartphone: 'I don't have a smartphone, so I cannot interact'.

Another downside is that smartphones require personal authentication, not allowing anonymity. Some students considered that a touch-sensitive display could resolve this problem and could also catch users attention, because 'if I saw people touching a display I would go there to see what it was', and perhaps it could foster interaction.

Finally, regarding the use of videos on interactive public displays, students said that the large screen did not support searching for 'the videos we like', as YouTube seems to do. However, they mentioned that 'YouTube is meant for individual use and a video application on public displays is interesting for using in a social gathering context'.

5 DISCUSSIONS AND CONCLUSION

Data analysis showed that the video contest only challenged a small fraction of the school population. The activity did not work for half of the students involved. Initially, 44 enrolled in the contest yet only 23 completed the whole process. Some teams failed to fully understand the 'tricky topic' they chose but did not ask for scientific mentors' help. Others failed to explain the 'tricky topic' through images and gave up.

On the other hand, the process worked very well for the teams who finished the videos. Of these, we can say that they were autonomous, self-motivated and responsible. They were also sometimes too independent and confident, because they did not involve the scientific mentor, and this affected the depth to which they explored the concepts they addressed.

Regarding the pedagogical relevance of the video creation process, results show that students can create useful videos to be used in the classroom, scientifically correct and with pedagogical potential. However, the process showed that some videos were not deep in the explanation of the topic covered. This highlights the importance of the teachers' involvement to promote the quality of the video.

Particularly interesting was to verify that students like to see their peers performing on the videos. This fact that was shown by the high level of interactions with the videos in which the students appeared in person. Those were the videos that generated the most interactions. For the students who were part of the video competition, there was also the expectation of seeing their own videos being exhibited.

Nevertheless, this high attention to the display did not translate into high levels of mobile interaction. In the interview we noticed that many students never realized that there was this possibility because they thought it was a regular TV. Despite the intensive communication effort and the video competition award that would be won by the video with the most interactions, many students never realized they could interact using their smartphones.

Findings suggest that students are receptive to making videos and to sharing them in public displays. This is important to foster curiosity around those videos.

Further research is needed to study the pedagogical relevance of this.

ACKNOWLEDGEMENTS

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement no. 317964 JUXTALEARN. We would like to thank school Escola Secundária de Alberto Sampaio (Portugal) for their collaboration on the technology deployment, on the promotion of the video competition and for the authorization to perform this research on their premises. We also would like to thanks to Displr for the display deployment and the assistant on the creating of the JuxtaLearn video application.

REFERENCES

Adams, A., Rogers, Y., Coughlan, T., Van-der-Linden, J., Clough, G., Martin, E., Collins, T., 2013. Teenager needs in technology enhanced learning. *Workshop on Methods of Working with Teenagers in Interaction Design, CHI 2013, Paris: ACM Press*.

Bardin, L., 2013. *Content Analysis*. Lisboa: Edições 70.

Bell, R., 2013. *Video reflection in teacher professional development*. http://repositories.lib.utexas.edu/handle/2152/22433.

Brignull, H., Rogers, Y., 2003. Enticing People to Interact with Large Public Displays in Public Spaces. International *Conference on Human-Computer Interaction INTERACT 2003*, 17–24.

Caetano, S. Falkembach, G., 2007. Youtube: uma opção para uso do vídeo no EAD. *RENOTE – Revista da Novas Tecnologias de Educação, Julho,* 1-10.

Goodyear, P., 2011. Emerging Methodological Challenges for Educational Research. In *Methodological Choice and Design*, 253-266.

Heitink, M., Fisser, P., McKenney, S., 2012. Learning Literacy and Content Through Video Activities in Primary Education. In P. Resta (Ed.), *Proceedings of Society for Information Technology & Teacher Education International Conference 2012* (pp. 1363-1369). Chesapeake, VA: AACE.

Jordan, L., 2012. Video for peer feedback and reflection: embedding mainstream engagement into learning and teaching practice, *Research in Learning Technology*, vol. 20, 16-25.

Khalid, A., Muhammad, K., 2012. The use of YouTube in teaching English literature: the case of Al-Majma'ah Community College, Al-Majma'ah University (case study). *International Journal of Linguistics, 4* (4), 525-551.

Kukka, H., Oja, H., Kostakos, V., Gonçalves, J., Ojala, T. 2013. What makes you click: exploring visual signals to entice interaction on public displays. *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems - CHI'13*. New York: ACM Press.

Lencastre, J.A., Coutinho, C., Casal, J., José, R., 2014a. Public Interactive Displays In Schools: Involving Teachers In The Design And Assessment Of Innovative Technologies. *In Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2014*, Vol. 2014, No. 1 (pp. 1760-1769). Chesapeake, VA: AACE.

Lencastre, J.A., Coutinho, C., Casal, J., José, R., 2014b. Pedagogical and Organizational Concerns for the Deployment of Interactive Public Displays at Schools. In Álvaro Rocha et al. (eds.), *New Perspectives in Information Systems and Technologies, Volume 2, Advances in Intelligent Systems and Computing Volume 276.* (pp.429-438). Springer International Publishing Switzerland.

Lencastre, J.A., Coutinho, C., Casal, J., José, R. (2014c). Adoption concerns for the deployment of interactive public displays at schools. In Giovanni Vincenti and James Braman (eds.), *Journal EAI Endorsed Transactions on e-Learning* 14(4): e6 , 1-7. ICST.

Meyer, J., Land, R., 2003. Threshold Concepts and troublesome knowledge: linkages to ways of thinking and practising within the disciplines (pp. 412-424). In Rust, C. (Ed.) *Improving student Learning - Theory and Practice Ten Years on*. Oxford: Oxford Centre for Staff and Learning Development (OCSLD).

Müller, J., Walter, R., Bailly, G., Nischt, M., Alt, F., 2012. Looking glass: A Field Study on Noticing Interactivity of a Shop Window. *Proceedings of the 2012 ACM annual conference on Human Factors in Computing Systems - CHI '12* (p. 297). New York: ACM Press.

Müller, J., Wilmsmann, D., Exeler, J., Buzeck, M., Schmidt, A., Jay, T., Krüger, A., 2009. Display Blindness: The Effect of Expectations on Attention towards Digital Signage. *Pervasive Computing: 7th International Conference* (pp. 1-8. Nara: Springer Berlin Heidelberg.

Otero, N., Alissandrakis, A., Müller, M., Milrad, M., Lencastre, J.A., Casal, J., José, R., 2013. Promoting secondary school learners' curiosity towards science through digital public displays. *Proceedings of International Conference on Making Sense of Converging Media - AcademicMindTrek'13*. pp. 204–210. New York: ACM Press.