STUDENT-GENERATED ONLINE VIDEOS TO DEVELOP CROSS-CURRICULAR AND CURRICULAR COMPETENCIES IN NURSING STUDIES

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Abstract

In response to the necessity of implementing innovative strategies and new teaching methodologies for the design of University degrees curricula according to the new educational model put forward by the European Space of Higher Education, we launched a pilot project in the Department of Nursing Studies of a university of the north of Spain based on the use of three technological tools (Power point, OpenMeetings and Babelium). Nursing students (n=29) were asked to create video recorded oral presentations about different techniques of diagnosis in medical imaging that were peer-, self- and teacher assessed. Self-report questionnaires were used to assess the effectiveness of the experiment and Kappa statistic analysis was used to determine the suitability of the assessment method. The results of the study showed that working with self and peer recorded videos proves to be a better didactic method to develop both cross-curricular competencies (intrapersonal, interpersonal and instrumental) and curricular specific competencies (in this case, knowledge about different techniques of diagnosis in medical imaging) than traditional methodologies. The data also suggest that there is an acceptable correspondence between self-, peer- and hetero- assessment.

Keywords: nursing education; multimedia; video making; cross-curricular compentency; self-assessment; peer-assessment;

1. Introduction

After over a decade since the Bologna Declaration marked a turning point for universities and knowledge-based society, higher education in Europe has taken a common path laid down by the project of the European Space of Higher Education. It is a path towards developing a model of higher education with the use of the European Credit Transfer System (ECTS) and with the intention of creating a higher education focused on learning and channelled towards the acquisition of professional competencies (Granero Molina, Fernández Sola, & Aguilera Manrique, 2010). The intention is to change the philosophy of studying through attaching more importance to the ability of dealing with learning tools rather than to sheer knowledge acquisition (Magalhães, 2010). There have been modifications to the role of teachers and students as well as to the teaching methodology and knowledge assessment, all made with the focus on the learning process rather than on the mere transfer of facts and

information. Students need to acquire practical competencies and abilities to learn independently, make decisions and express ethical commitments.

According to many authors (Boyatzis, Cowen, Kolb, & Associates, 1995; Drury & Taylor, 1999; Taylor & Drury, 1995, 1996), the most effective way to ensure that students acquire practical competencies and generic skills is to integrate the teaching of those skills into course curricula, in a holistic approach to teach disciplinary knowledge and generic skills. Due to this assumption, these generic skills are usually known as cross-curricular competencies.

Video is a rich and powerful medium being used in e-learning that can present information in an attractive and consistent manner that engages students. Zhang et al. (2006) suggest that students using interactive video in their learning environments (video that allows proactive and random access to its content) achieved significantly better learning performance and a higher level of learner satisfaction than those in other settings.

The use of online video for examination of instrumental and interpersonal competencies in health-sciences is not new. Humphris & Kaney (2000) and Hulsman, Mollema & Hoos (2004) reported the development and benefits of a structured video exam for assessment of communication skills in a medical course context. Furthermore, video-recording and online peer-assessment activities have been found to benefit students who struggle to attend face to face lectures (McConville & Lane, 2006). They adopt deeper approaches to learning because they feel less inhibited than if they had to participate in role play sessions in front of a large class (M. A. Freeman & Capper, 1999; Olaniran, Savage, & Sorenson, 1996).

However, as Kay (2012) recognizes in his thoroughly review of the use of online videos in education, there is a lack of modern research about how generic skills can be positively developed through the creation and peer-assessment of online videos.

This paper describes a practical project which was carried out at university level in the north of Spain - Department of Nursing Studies- in order to evaluate generic skills, in particular a subset of interpersonal competencies (cooperation, teamwork and others' criticism, intrapersonal competencies (capacity for autonomous learning, attitude towards new learning tools, awareness of their learning process and self-criticism), and instrumental competencies (ability of dealing with new technologies, aptitude for oral and

written communication and creativity) through the creation and self- and peer-assessment of online videos.

This study aims to enrich the existing body of literature, while augmenting the understanding of the benefits in generic skills development, by exposing our practical experience of nursing students using open source tools to record and peer assess online videos.

The following sections provide details on how the research was conducted as well as what the chief conclusions were and what lessons were drawn. Section 2 revises the literature related to the project. Section 3 presents the main objectives and research questions, and outlines participants' profiles, materials and applied procedures. Section 4 shows the students' opinions on didactic benefits of the research as well as a brief analysis of data accumulated through peer-assessment, self-assessment and the assessment provided by the teacher. Section 5 discusses some of the quantitative and qualitative data presented earlier and proposes possible reasons to explain the mentioned results. Lastly, in Section 6, we summarize main conclusions of the project and outline some recommendations for future research.

2. Related work

2.1 Video in the classroom context

Online video recordings of lectures or subject related material for teaching and learning has been used before. Kay (2012) provides a comprehensive review of research literature about how online video files impact on teaching and students' learning outcomes. Kay highlights in his findings positive affective, cognitive and behavioral students' attitudes toward the use of online video recordings (video podcasts). Yet, the literature also warns about some challenges experienced when using online videos in the classroom context, mainly related to technical issues (big file sizes, download times, significant technical knowledge required to download and use online video material) and in some cases, the sheer preference for off-line classical lectures.

Most academic papers are focused on the use of passively viewing of online video recordings. Previous applications of video materials in specialized courses in engineering, medicine, pharmacy and chemistry produced good results. For instance, in their work Romanov and Nevgi (2007) used short videos to help medicine students to understand various matters explained in

class. As a result, students displayed better academic performance. Similarly, Kamin (2003) shows that after having attended video virtual classes within the rotation program in several pediatric centers, 3rd year medicine students display greater critical- thinking skills. Cox (2011) incorporates elements of digital learning (health-related videos) into PowerPoint presentations within the courses in biochemistry and organic chemistry. He does it with a view to improving the quality of academic resources available outside the classroom and to enhancing students' positive attitudes and commitment towards learning new ideas and concepts. Other research by Wang (2010) shows how they record a part of their lessons and make them available online so that the students can watch them in advance and in the process internalize the concepts taught in class more effectively.

On the other hand, research shows that viewing online video material alone is not enough to guarantee deep and meaningful learning. Supported by the constructivist theory those academics view learning "as a formation of abstract concepts in the mind to represent reality" (Zhang et al., 2006). They posit that learning occurs when a learner constructs internal representations for his or her unique version of knowledge (Tsay, Morgan, & Quick, 2000), so if learning is to occur, students should be provided with activities that ask them to play active and creative roles during knowledge construction, which means that it is not enough to merely broadcast online videos to students. It is necessary to design learning activities using videos that provide students a sense of control over what they are doing, in a way that challenges them to interiorize the subject related knowledge so they are able to communicate and explain it to their peers and non-technical people using plain terms and their creativity skills.

However, there are not many papers suggesting the benefits on skill development associated with the creation of online video material. Alpay & Gulati (2010) and Armstrong & Massad (2009) reported that students felt they improved with respect to analytic, communication, cooperation, creativity, and technology skills. Correspondingly to our research, McCormack and Ross (2010) carried out a collaborative project in order to integrate video materials into practical activities. Their students search the web, compile information and create collaborative videos to increase their conceptual understanding of the subject (bacterial transformation). As Kay (2012) asserts, there is a lack of research on this promising area.

2.2 Generic skills development in nursing studies using videos

According to the European Commission funded Tuning research project (González & Wagenaar, 2003), interpersonal skills are seen as central to some high education subject areas such as Business Studies, Nursing and Education. In nursing, particularly, interpersonal communication abilities are fundamental, and communication aspects are key skills for the profession.
The same project notes that although students are already in possession of many interpersonal skills when they start higher education given the importance of interpersonal abilities for those fields, those competencies should be substantially improved. For doing so, students may be aware of the fact that they have much to learn in this field, and for that aim, educators should encourage students to do a self-critical evaluation of their existing knowledge and to find out whether what they believe they say (what they try to communicate) is effectively understood by others.

On the other hand, computing and technological revolution in information and communication has been inducing changes in all contexts including the field of healthcare science. Indeed, the development of Information and Communication Technologies (ICTs) has significantly influenced the everyday work of a nurse by potentially facilitating and enriching the communication between a patient and the medical personnel.

Technological innovation aimed at enhancing long-distance patient care requires of a nurse to exhibit effective communication skills as much as technological competencies. Therefore, acquiring adequate skills for the management of resources and new technologies will be especially useful for the efficiency in everyday performance, as proficiency in this area facilitates long-distance communication between patients and medical personnel through, for example, audiovisual presentations (Romá Ferri & Vizcaya Moreno, 2000; Gassert,2008).

Nursing students need to learn how to effectively care for patients, know their needs and be able to communicate this knowledge in an appropriate way. Neary (1997) stated that nursing students are not able to reach those goals simply by having knowledge and skills; they must learn to apply those skills in real-life situations. McConville & Lane (2006) proposed the use of online video clips to foster the communication skills in nursing studies. They developed online video clip material that showed examples of nurses dealing with potentially difficult and delicate patient groups and showed that

students' self-efficacy to cope with these situations increased noticeably after viewing and discussing such videos.

Other researches in Nursing Studies have also used videos in a more active way, for working self-assessment, resulting a valuable tool for healthcare professionals as they reflect on interpersonal skills (Kim et al., 2002; Mazor, Haley, Sullivan, & Quirk, 2007; Zick, Granieri, & Makoul, 2007), improve students 'own clinical skills and how they cope with problems that they encounter in clinical practice (Chou & Lee, 2002; Pinsky & Wipf, 2000).

Yoo, Son, Kim and Park (2009) developed an experiment making nursing students to self-evaluate their ability to measure vital signs and their communication skills after reviewing their video recorded activities. The results suggested that video-based self-assessment is a beneficial and effective instructional method of training undergraduate nursing students to develop awareness of their strengths and weaknesses, and to improve their clinical and communication skills.

3. A research study

3.1 Research Questions

As the constructivist theory maintains, learning occurs when learners construct internal representations for their unique version of knowledge (Tsay et al., 2000). Taking this fact into account, and in order to improve interpersonal skills and the ability to use technological tools, in this action research we ask nursing students to fulfill the task of creating video recorded oral presentations that will be peer-, self- and teacher assessed. This holistic approach requires playing active and creative roles during knowledge construction in an attempt to achieve curricular and cross-curricular competencies.

Specifically, the aim of this experiment was to find out evidence to answer the following research questions:

- Are self video-recorded presentations useful for developing interpersonal competencies (cooperation, teamwork and others' criticism)?
- Are self video-recorded presentations useful for developing intrapersonal competencies (capacity for autonomous learning, attitude towards new learning tools and awareness of their learning process, and self-criticism)?
- Are self video-recorded presentations useful for developing instrumental

competencies (ability of dealing with new technologies, aptitude for oral and written communication and creativity)?

- Are self video-recorded presentations useful for developing curricular competencies?
- Are the students' self-critical evaluations of their video-recorded presentations aligned with the peer-assessment and this with the teacher's opinion?

3.2. Method

3.2.1 Participants

The project involved 29 students and one teacher of the obligatory subject "Structure and Function of the Human Body I" at the Nursing School of a university of the north of Spain. The subject is awarded 6 ECTS credits and is taught in the first year of nursing studies. The initial knowledge of computer-based tools and their application were basic for both the students and the nursing teacher.

3.2.2 Description of the experiment

Being a part of the theoretical-practical program of the subject, one of the objectives is to get to know and be able to compare different techniques of diagnosis in medical imaging: radiography, magnetic resonance (MR), computed tomography (CT scan), ultrasonography, positron emission tomography (PET), single-photon emission computed tomography (SPECT) and endoscopy (gastroscopy and colonoscopy).

Each of the students was assigned one of the techniques of diagnosis to study, and after some time of teamwork dedicated to research, compile and select data, they had to create an explanatory video about the assigned technique where they had to apply three technological tools described in the following section. The video should provide illustrative images which will explain the basics of the technique and the most relevant information.

Such visual information should be accompanied by oral explanations (audio and video) in which students should offer an appropriate explanation as if they were presenting the information in front of a patient or a patient's relative.

The student is expected to expend the following time on the activity: 0.5 hours on the explanation of the project and the technological tools applied (in-class activity), 4 hours of teamwork and the video creation (1 hour for in-class activity and 3 hours for out-of-class activity), 1 hour for the display and analysis of some videos in the classroom (in-class activity) and 1

hour for assessment of the work presented by their fellow students (out-of-class activity). On the whole, it accounts to 2.5 hours for in-class activity and 4 hours for out-of-class activity.

3.2.3. Technological tools

We applied three computer-assisted tools which enabled the creation, display and subsequent assessment of videos created by students: PowerPoint, OpenMeetings (Wagner, 2012) and Babelium (Sanz-Santamaría, Pereira Varela, & Gutierrez Serrano, 2010).

PowerPoint

This tool is a popular software used regularly in the academic community as well as in company environment to create visual presentations. In spite of the fact that students were offered an alternative of using LibreOffice Impress instead, all of them were already familiar with the Microsoft software and had a previous experience of working with it; therefore they decided to use it to make their own presentations.

OpenMeetings

OpenMeetings is a free software application which enables holding audio and video conferences, sharing a digital whiteboard, delivering presentations in PDF, ODP and PPT file formats to an online audience and video recording of meetings. In the experiment we used OpenMeetings in order that the students record their voice and image and incorporate it into the presentation previously prepared with the PowerPoint software.

Babelium

Babelium is an open-source software which allows users to improve their skills of oral self-expression through the use of videos. Although initially focused on the area of language learning, it allows students to make use of a microphone and/or a webcam, they are able to do video exercises in an interactive way and in real time. The answers submitted by the users (in audio or video) are displayed in the assessment section where the rest of the system users can assess them in a collaborative manner. The software also enables the users to upload videos from their computers.

3.2.4. Project Development

A high-quality video requires a high-quality script. It means that a prerequisite step is to do a deep literature research on the assigned

theoretical concept. The teacher submitted a reference list and students were advised to search online for additional information, select data and organize information. The teacher explained the basic aspects of literature search stressing the importance of reliability of various sources of scientific information. After allocating and discussing the compiled data in small groups, the next step was to select the most relevant information so that the assigned diagnostic technique was explained in a clear and adequate fashion (easily understood by a patient or the patient's relatives).

Once the information was selected, students developed a script which served as a common theme to the explanatory videos and which marked the first stage of the four-stage process, as depicted in Fig. 1: make slideshow, make video presentation, upload video presentation and assess peers' videos.

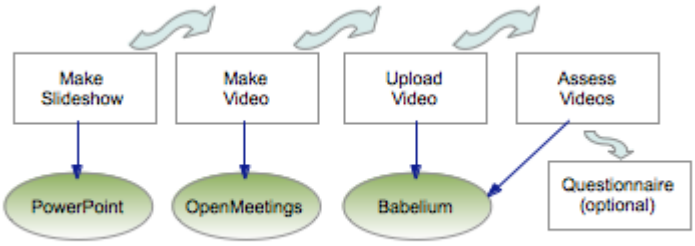

Fig. 1. Stages of the experiment and technological tools applied

During stage 1, after having acquired the necessary knowledge of the technique and having selected and organized the information, the student proceeded to make a digital slideshow (in the ODP, PPT or PDF formats). It lays the grounds for the second step: making a five-minute long video with the student's voice-over narration explaining each presentation slide. The synchronization between voice and image was made possible by the OpenMeetings software which enabled the students to record their voice and image over a previously uploaded presentation (Fig. 2) in one of the indicated formats. The teacher emphasized how important it was that the explanation of the assigned technique be provided in an adequate form to the recipient of the information (correct register, clear explanation and adequate degree of information complexity for a potential patient of a patient's relative).
The third step consisted of uploading completed projects onto the Babelium website along with an appropriate label, a short title, a brief description and the name of the author. These projects were directly posted in the assessment section where the remaining students could offer their evaluation. Thus, once the video became available for assessment, both the students and the teacher continued to assess the projects by providing a written commentaries as well as a numerical grade.

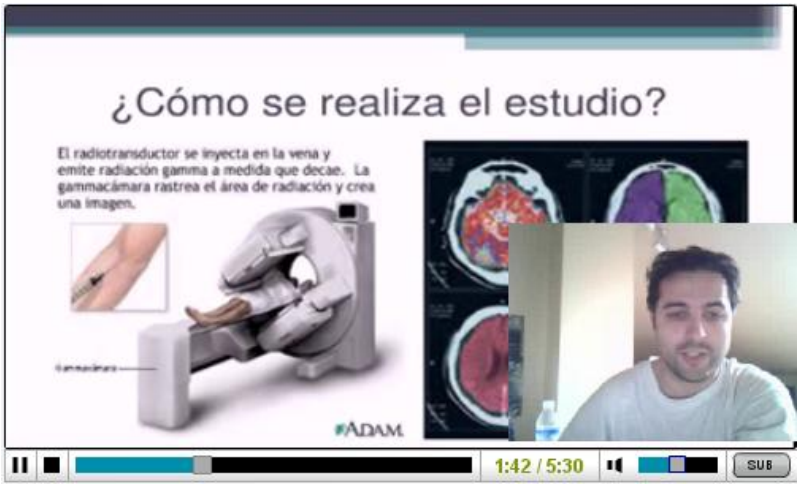

Fig. 2. *An example of a video created in OpenMeetings with the webcam image embedded*

Each student was entrusted with the task of evaluating at least 10 projects (peer-assessment) as well as their own project (self-assessment). To ensure that all the projects were assessed by a similar number of students, we designed a tool which makes the videos with the lowest number of assessment rank first in the list of videos, so that they are given priority guaranteeing an equitable number of reviews. On the other hand, guided by the aim to avoid a situation in which one student's assessment will influence the judgment of other students, we implemented a tool which precludes the other students from keeping track of the grades awarded by other students. The following assessment criteria graded on a scale of 0-5 have been defined: (i) evaluating the content (conceptual precision, explanatory clarity and information adequacy for a patient or the patient's relatives), (ii) evaluating the form (structure adequacy, visual quality and creativity) and (iii) general rating. At the end of the assessment process, students completed an anonymous questionnaire in order to gather information about students' attitudes towards new technologies and, more specifically, towards video as a communication platform, and to investigate the extent to which students felt satisfied with the educative results of the novel experiment. The questionnaire comprised 28 closed-ended statements where students were asked to express their stance with one of the following responses: a lot, quite, little, very little. Moreover, it included some open-ended questions so that students were given a chance to post a comment about the best and the worst aspects of the experience, as well as suggestions to improve them.
The final assessment was provided on the base of: attending lectures and practical in-class teamwork sessions (20%), the teacher's assessment of the video (40%), fellow students' assessment of the video (20%), evaluation of

the commitment to peer-assessment and self-assessment (20%).
Finally, with the intention to assess the degree of achievement of the curricular competency, that is, the theoretical knowledge about different techniques of diagnosis in medical imaging, in the subject's final exam, students were challenged with a question on what they had to give the most relevant information to a patient or the patient's relatives about the different techniques studied.

4. Findings

According to the students' opinions on didactic benefits of the experience and the analysis of data accumulated through peer-assessment, self-assessment and the assessment provided by the teacher, the main findings of the study about the development of cross-curricular and curricular competencies, and the suitability of the methodology are summarized as below:

** are self video-recorded presentations useful for developing interpersonal competencies (cooperation, teamwork and others-criticism)?*

Even though for 92% of the students this kind of collaborative work (gathering data and writing a script in workgroups) and collaborative assessment (rating the fellow students' projects) was a complete novelty, 74% stated that the didactic experience was satisfactory and learner-centered, having enjoyed a good atmosphere in the workgroup. Furthermore, 97% qualified 'as useful' the task of watching and assessing the work done by their fellow students. They found it useful for "correcting mistakes and improving future presentations". In spite of the fact that the overall assessment of the experience was positive, most of the students indicated to the teacher that they would much rather make their recordings with a microphone than a webcam. The given reason was that they "felt ashamed" when watching themselves on screen; but even more when they knew they would be subject to evaluation and that their fellow students could watch them too in order to evaluate their work. Thus, none of the students explored the possibility offered by Babelium to add a webcam recorded image of themselves on top of their video presentations.

** are self video-recorded presentations useful for developing intrapersonal competencies (capacity for autonomous learning, attitude towards new learning tools and awareness of their learning process, and self-criticism)?*

As far as the possibilities offered by the online tools are concerned, namely watching and analyzing various projects uploaded by fellow students anytime

and anywhere, 89% highly appreciated this possibility as part of the self-study process.
However, when asked about their preferences as to different forms of workflow (individual oral presentation, oral presentation resulting from cooperative effort, individual video presentation or video presentation based on cooperative work), only 37% opted for working with video-recordings; out of this 37%, 16% preferred individual work, while the rest, 21%, selected teamwork. Despite this apparent skepticism regarding new teaching methodologies, in what refers to the innovative way of assessing, since the very beginning, students were more than willing to evaluate their peers in a collaborative way. In fact, even though they were required to evaluate at least 10 projects, some of them assessed all the projects presented (a total of 29).
In spite of the fact that the students felt enthusiastic about the suggestion of evaluating their fellow students in a collaborative way, by contrast, the attitude of the students when we proposed them to assess their own work was not as well received, surely, by the novelty of the initiative and the challenge of self-evaluation (self-criticism). In fact, some students (n=3) did not provide any self-assessment. Nevertheless, as it can be seen from the results section entitled "are the students 'self-critical evaluations of their video-recorded presentations aligned with the peer-assessment and the teachers' opinion?", students took on the task with responsibility and self-critical attitude, and they sometimes gave even lower grades to their own work than those given by the group and the teacher.
The results show that the overall assessment of the experience about the learning process was positive, as 84% confirmed that the learning outcome was "quite-really" worth the effort and the highly rated aspects included teamwork and the analysis of the others' projects as part of the collaborative assessment.

** are self video-recorded presentations useful for developing instrumental competencies (ability of dealing with new technologies, aptitude for oral and written communication and creativity)?*

With regard to the acquisition of instrumental competencies, 82% admitted that participating in the activity helped them to improve their technological competency. In fact, some of the students indicated this aspect as the most positive and valuable experience.
As we indicate, most of the students admitted having improved their technological competency, but no more than 53% of students stated that the exercise contributed to the development of their creativity. This raises the

issue about what creativity means, and will be discussed in the next section. The average final score awarded by the teacher in the section on creativity was 7.5 ± 1.4 out of 10. Such a score is high, but in any case less than the scores obtained in the aspects related to content (conceptual precision, explanatory clarity and information adequacy for patients or their relatives) and form (structure adequacy and visual quality), with an average of 9.1 ± 1.1 and 9.5 ± 0.7, respectively. In this sense, only 17% of students performed audio accompaniment spontaneously, that is, without reading it directly. However, these students did not get a better evaluation in the section on creativity, where students were assessed by their use of the imagination or original ideas in their video-performances.

** are self video-recorded presentations useful for developing curricular competencies?*

Firstly, students were asked to share their insights into the suitability of the presentation methods (oral in class or through assessed videos on Babelium) for the development of curricular competencies in comparison to the acquisition of cross-curricular competencies. 71% concluded that working with videos proves to be a better presentation method when the chief objective is to develop cross-curricular competencies. Nevertheless, students' opinion was neutral (53%) about recording video presentations to develop subject-specific competencies.
However, when they were asked about the level of theoretical knowledge acquired (techniques of diagnostic in medical imaging), 89% of the respondents defined the achieved level as "a lot-quite" on the applied scale. In the same vein, as mentioned in Section 3.2.4, the degree of achievement of the curricular competency was also assessed by a traditional methodology. With respect to the grades awarded in the final written exam for the question exposing the role of a nurse in giving the most relevant information to a patient or the patient's relatives about different techniques of diagnosis in medical imaging, the results were satisfactory, with the average grade being 8.5 ± 0.5 out of 10, and, in any case, better than the grades obtained in previous years (8.5 vs. 7), where no multimedia experience was developed.

** are the students' self-critical evaluations of their video-recorded presentations aligned with the peer-assessment and the teachers' opinion?*

The grades awarded to students' own work (self-assessment) were, in general, on a par with the average grade given by fellow students, the lowest self-assessment being 7 and the highest 10 (only one student). The average difference between the self-assessment and the peer-assessment was 0.29 points with the standard deviation of 0.89 points. Interestingly, 8 students awarded themselves worse grades than their fellow students saw them fit to obtain (Fig. 3).

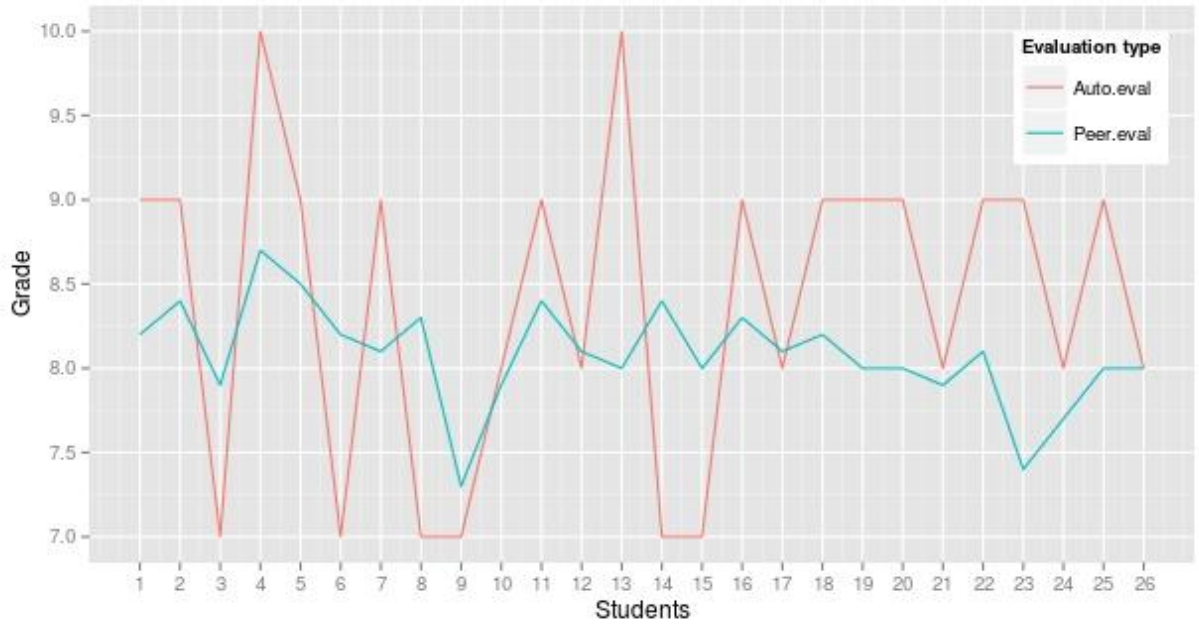

Fig. 3. Auto- vs. Peer- evaluations

The comparison between peer- and teacher- assessment (Fig. 4) shows that in this case teacher has been, in general, more generous with the grades, assigning only in 7 cases grades below peers' opinion. Note that both Fig. 3 and Fig. 4 show only students without missing values in auto-, peer- or teacher- evaluations.

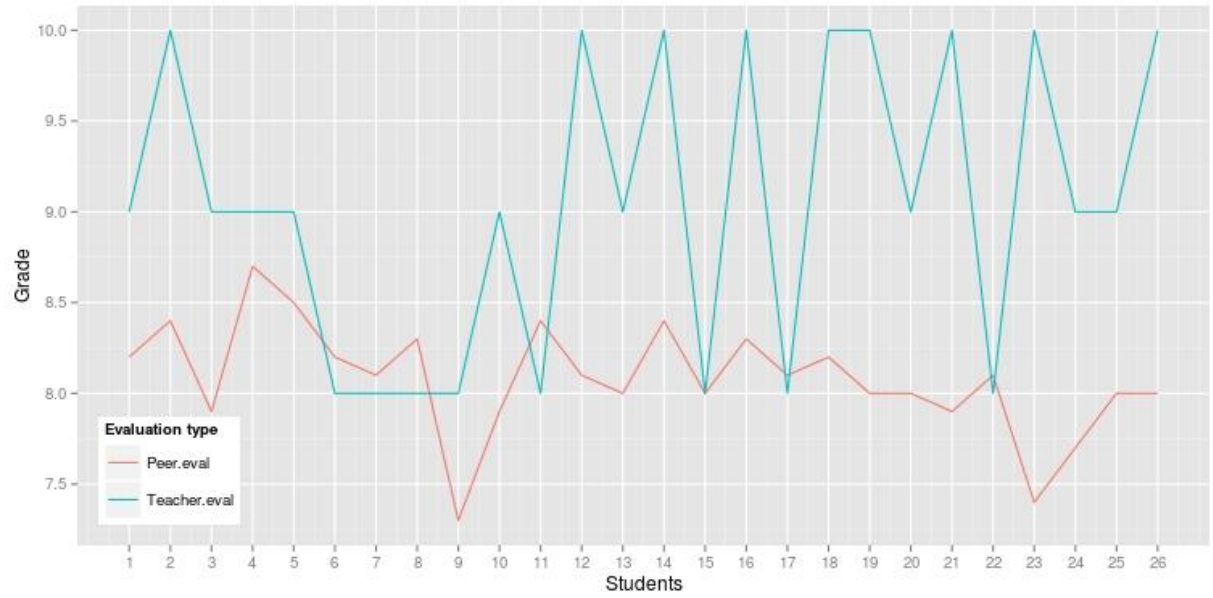

Fig. 4. *Peer- vs. Teacher- evaluations*

The grading framework has been studied in depth in order to analyze the extent to which peer-assessment is aligned with self-assessment and teacher-assessment. We were particularly interested in answering the following questions:

- Is it right to use the average grades given by a group of students to foresee the grade awarded by the teacher? Or in other words, can a teacher use peer evaluation as a benchmark?
- What is the correspondence between self-assessment and the average grade of peer-assessment?

In order to determine the interrater correlation we used the Cohen's kappa statistic coefficient (Viera & Garrett, 2005) which enables contrasting two assessments. The value of the kappa coefficient may waver between -1 and +1. The nearer the value is to +1, the greater the level of correlation between the variables, whereas when the kappa value is close to -1, there is a high level of discordance. The kappa value of $\kappa=0$ indicates that reported correlation results from a mere coincidence.

Table 1 compiles grades awarded by a group (peer-assessment) compared to grades awarded to own work (self-assessment), whereas Table 2 compiles grades awarded by a group (peer-assessment) compared to grades awarded by the teacher (hetero-assessment). The reader should bear in mind two aspects: firstly, the number of students who performed the task of self-assessment does not coincide with the total number of participants (3 students did not provide any self-

assessment); secondly, in general, the students gave high grades in self-and peer-assessment (minimal grade was 7.3) therefore three grade thresholds were established: A= [7-8), B=[8,9) and C=[9,10).
For instance, in Table 1, the value 2 which appears in cell (As, Ap) indicates that there are 2 self-assessments coinciding with their respective peer-assessments in the A threshold. The value 4 in cell (As, Bp) indicates that in case of 4 assessments, the self-assessment is in threshold A while their peer-assessments are in threshold B. Cell (As, Cp)=0 indicates that there were no self-evaluations in threshold A which had their corresponding peer-assessment in threshold C.

Table 1.
Correlation between peer-assessment and self-assessment

	Peer-assessment			
Self-assessment	Ap	Bp	Cp	Total
As	2	4	0	6
Bs	3	3	0	6
Cs	1	11	2	14
Total	6	18	2	2

Table 2.
Correlation between peer-assessment and hetero-assessment

	Hetero-assessment			
Peer-assessment	Ah	Bh	Ch	Total
Ap	1	5	2	8
Bp	7	5	7	19
Cp	0	2	0	2
Total	8	12	9	29

The analysis of the Kappa coefficient for the data in Table 1, reported a value of K= 0.21 which, according to the widely referenced categorization offered by (1977), as seen in Table 3, indicates that the grade of correlation is acceptable (fair). That means that the self-evaluation generally coincides with the grades awarded collaboratively by the group. As mentioned, the average difference between self-assessment and peer-assessment was 0.29 points with the standard deviation of 0.89 points. Thus, it explains the high percentage of students who agreed (in their questionnaire answers) with the received peer-assessment (88%).
However, upon comparing the grade of correlation between assessment by the teacher (hetero-assessment) and by the group (peer-assessment), the value of K stood at K= 0.15, which indicates a slight correlation between the two values.

Table 3.

Landis and Koch's categorization of Kappa values

Kappa Statistic	Strength of Agreement
<0.00	Poor
0.00-0.20	Slight
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.00	Almost Perfect

Keeping in mind a close correlation between self- and peer- assessment, possible causes conducive to such a deviation are examined in the following section.

5. Discussion

In the same line as Neary (1997) and other previously mentioned authors, we are also aware by the fact that students are not able to effectively care for patients simply by having knowledge and skills, and that they must learn to apply those skills in real-life situations. For this reason, and taking into account the potential risks associated with pre-graduate students practicing communication skills in a real scenario- where information must be precise or nurses need to cope with a range of difficult and delicate situations (e.g. as when patients receive bad news)-, we thought that it would be more prudent to simulate these situations before facing real-life. The students recognized to "feel ashamed" when watching themselves on screen, aware of the fact that they would be subject to evaluation and that their fellow students could watch them too. That could be the reason why none of them explored the possibility offered by Babelium to add a webcam recorded image of themselves on top of their video presentations. This finding corroborates the evidence suggested by Gromik (2012) were Japanese English students were reluctant to show their videos to others because of being ashamed of their poor speaking ability. This attitude evidences that although students are already in possession of some interpersonal skills (such as teamwork, where students were able to develop a good video script collaboratively, or criticism, where students demonstrated good peer-assessment skills), there is a lack of confidence about their self-expression ability, and should be object of evaluation in future experiences. These findings are somewhat in opposition to some studies that show that students feel less inhibited than if they had to participate in front of a large class (Mark A. Freeman & Capper, 2000; Olaniran et al., 1996). Hence, the approach developed to simulate real-life situations by using

new technologies, including those which expose students to stress and anxiety seems to be effective.
Moreover, this lack of confidence could also be the reason that only 17% of the students claimed that their creativity skills had been improved. Although the creation of a multimedia presentation could encourage creativity and enhance learners' cognitive skills (Liu, 2003), we have found that some of our students' presentations are too fact oriented, in some occasions, directly translating book content to a video environment, without any artistic license to make the video more attractive and enjoyable to the audience. Nevertheless, as Odena (2001) points out, even secondary school teachers of music recognize that there are a lot of complexities in defining the term 'creativity' and that the use of video to improve this aspect needs further enquiry.

The competency specific to the subject "Structure and Function of the Human body I" outlined in our proposal (theoretical knowledge about different techniques of diagnosis in medical imaging) involves complex concepts that can be difficult to understand, so it is essential that the information is well selected, directed and presented in an attractive and understandable way.
On one hand, the fact that no student had prior theoretical knowledge about the techniques of diagnosis in medical imaging - because the teacher did not offer any theoretical explanation in class - presented all the peers as non experts. That made the scenario more real, and helped the students to design their presentation in an appropriate way that could be understood by any non expert patient or patient's relative.
On the other hand, we can say that the work methodology to carry out the proposed activity, that is to say, to create a video recorded presentation that combine text, image and voice, has been adequate and effective to achieve a better understanding and a higher degree of learning about the curricular competency. This can be deduced from the qualifications obtained in the final exam, that were better than the ones obtained in past courses, where information was presented just in plain text -without any multimedia element- and the students' subjective evaluation, who defined the achieved level as ″a lot-quite″ on the applied scale. This finding is reasonable and supports previous research that indicates that using verbal and visual information simultaneously improves learning (R. E. Mayer, 1989; R. E. Mayer & Anderson, 1992; R. E. Mayer & Gallini, 1990). This results are in accordance with the cognitive theory of multimedia learning ("multimedia effect") proposed by Mayer (1997) and Mayer & Moreno (2002), that states that students learn more deeply from multimedia explanation presented in words and pictures than from one using words alone, and is congruent with the dual coding theory (Clark &

Paivio, 1991; Paivio, 1990), that suggests that learning is enhanced when complementary information codes (nonverbal -visual, image- and verbal -language-) are received simultaneously, such as a combination of visual and auditory information. The research made by She & Chen (2009) also indicates that students learn better when information is presented with multimedia, combining audio-visual formats, rather than in visual-only format, giving empirical evidence of the deeper learning level achieved through the use of multimedia resources by analyzing the eye fixation behavior pattern. Another example is the work done by Mousavi and colleagues (1995), in which it is shown that students learned better when instructional material was presented in audio-visual format than when the material was presented in visual-only format.

Our students were using video presentations supported by PowerPoint generated slides. Despite the benefit of PowerPoint is continuously debated (Norvig, 2003), having demonstrated, for example, that students retained less information delivered verbally by the lecturer during PowerPoint presentations (Savoy, Proctor, & Salvendy, 2009), other researchers suggest that, when properly used, students prefer slideshow supported lectures over traditional presentations (Apperson, Laws, & Scepansky, 2008). Our study suggests that lectures could be more interesting when students add video and audio elements to self-recorded slide-based presentations. As the constructivist theory proposes, richer and more interactive learning environments are necessary to engage learners. In this regard, graphics, video, and other media can help by interesting and engaging learners in a Web-based learning environment. Web-based education supported by the constructivist theory should thus enable learners to engage in interactive, creative, and collaborative activities during knowledge construction (Brandt, 1997). The idea is that students learn by investigating, collaborating, researching, and, eventually, developing their own video presentations. It is clear that multimedia offers great potential as powerful learning technology to enhance human learning, and can help to understand difficult concepts (She & Chen, 2009) such as, in our research, different techniques of diagnosis in medical imaging. In this sense, students-designed animation and simulation can help themselves and other students to construct their own mental representation of the theory which will, in turn, improve their learning process. Besides, some studies point out that simulation, which is defined as “the representation of learning material on the screen, giving the learner opportunities to learn through interacting with, or manipulating, the material “ (She & Chen, 2009), can foster critical thinking, problem solving skills and more inquiry learning (Baggott, 1998; Linn, 2011). This idea of simulation can be better developed in future

experiences, and requires an approach related to new lines of research to develop software, for example, to allow the use of Babelium by students not just to evaluate, qualify and discuss the work of their peers, but also to allow students to correct and modify the videos made by their classmates and, in this way, interact with the didactic material.

Apart from the aforementioned reasons, and in relation to the acquisition of instrumental competencies, the methodology followed in our experience, has been useful to improve the ability of dealing with new technologies, as shown in our results, where 82% of the students admitted that participating in the activity helped them to improve their technological competency. In fact, some of the students indicated this aspect as the most positive and valuable experience, in spite of having suffered some technical problems that led to having to repeat some recordings more than once. These issues were related in part to audio, video and networking problems although the most significant one was related to a temporary failure in the OpenMeetings application due to insufficient disk space. This behavior arose because of the huge amount of recording attempts discarded by the students -but not deleted-. This is a significant fact that might demonstrate the students' commitment to do a good work with their recordings. This behavior seems to prove that they were concerned about achieving a good quality video-presentation and, thus, they tried a lot of times before publishing a final version of their work. The acquisition of this particular cross-curricular competency is essential for professional nurses nowadays, because technological innovation has induced changes -and continuously introduces changes- in the field of healthcare science. Certainly, one of the innovations that is emerging in many countries to facilitate and enrich the communication between a patient and the medical personnel (especially when large physical distance exists between patient and nurse) is Telenursing, which makes possible to provide health-related services and information via telecommunications technologies (Williams, Hubbard, Daye, & Barden, 2012). Nurses must demonstrate competencies in computers, informatics, and computer literacy to ensure patient safety, care quality, access, and efficiency.

Due to no previous experience in creating and editing videos and some technical problems that emerged, students put in more hours than initially planned (at least 6 hours more of out-of-class activity). All in all, taking into account the time spent in past years and the satisfactory results in both achievement of curricular and cross-curricular competencies, we can say that the used method, supported by online tools, has the potential to decrease instructor time and increase access to powerful learner-centered environments,

where learner can practice cross-curricular competencies, even complex interpersonal skills (Campbell, Lison, Borsook, Hoover, & Arnold, 1995). This is of great importance, because many jobs today, and especially among healthcare professionals, team problem solving and enhanced interpersonal skills are required. Training in this area is time consuming and, sometimes, coaching in this skills and assessing them is difficult in a typical class scenario, where time and space are limiting factors. Technology offers the possibility of reducing instructor time and, therefore, can make it possible. As we mentioned before, the highest rated aspects by the students that took part in the experiment were teamwork and the analysis of the others' projects as part of the collaborative assessment. Lim (2012) and colleagues define co-experience as "user experience that is created through social interaction under product or system usage and involves an interactive perspective in the second-person rather than first-person point of view". When doing collaborative assessment by using online tools such as Babelium, students are sharing the same experience, and are able to foster effective collaboration and diverse participation with each other despite the physical distance between them. We can say that this kind of tools is useful to reduce psychological distance and enhance co-experience among users, which results to be especially satisfactory and enriching. However, despite the willingness and enthusiasm shown for the innovative way of assessing the projects, none of them explored the possibility offered by Babelium to add written commentaries about the their fellows' work. The underlying reason of having restricted the evaluation just to a numerical grade, without adding any more text or justification is unknown and needs further investigation but could be related to some sense of fear to be critical about peers' works and the lack of self confidence in their own criteria.
On the other hand, the analysis of the data about the correlation between the different assessments seems to indicate that self-assessment coincides reasonably with peer- assessment. By contrast, when comparing hetero-and peer-assessment, the data indicate a slight correlation between the two values. This apparent discrepant data can be explained if we take into account the strategy used by the teacher, which decided to compensate the extra workload -that will be next discussed- with some extra points, the range being from 0.5 to 1 point. It explains, as reflected in table 3, the fact that marks awarded by the teacher were generally more generous than the peer-assessment.

Despite the advantages that we have mentioned and the fact that the vast majority of the students that took part in the experiment confirmed that the learning outcome had been "quite-really" worth the effort, when the students were asked about their preferences as to different forms of workflow, only 37%

opted for working with Babelium. In this regard, the teacher reported that the students felt overwhelmed by the difficulties with using the new technological tools and the technical problems that were derived (issues related to audio, video and server disk limitations). That meant a great challenge for both the students and the teacher, whose level of management of new technologies was basic. As other studies also point out, there is a concern that many nurses may not possess these informatics capabilities, and indicate that nurse educators are not prepared to teach them (Fetter, 2009). This experience can be considered as a starting point, and its implementation could be useful for both students and teachers to move forward the acquisition of effective technological tools.

In the same line, when students were asked about the suitability of the new methodology carried out to obtain curricular and cross-curricular competencies, they did not recognized the effectiveness of the class-worked methodology with respect to other traditional methodologies for specific competencies of the subject, in this case, knowledge about different techniques of diagnosis in medical imaging. However, they do recognize it to achieve cross-curricular competencies (instrumental, interpersonal and intrapersonal competencies). We can say that this subjective feeling or opinion about the degree of acquisition of the curricular competency and the objective test carried out to measure the degree of learning of the technique show discordance. Thus, the results obtained in the final written exam about the techniques of diagnosis show a high degree of learning, higher even than the one resulted in past courses. In addition, when students were directly asked about the degree of learning achieve, 89% of them responded that it was “a lot-quite”. This answer, seemingly discrepant in relation to the first question, may be due to a reluctant or skepticism toward new methodologies. This leads us to think that maybe to make an effort to integrate new forms of work in the classroom is necessary, but it is also a must the acceptance and collaboration of both traditional teachers and students.

6. Conclusions

This paper has described a project completed in the subject “Structure and Function of the Human Body I” at the Department of Nursing Studies of a university of the north of Spain, designed with the aim to develop and assess some curricular and cross-curricular competencies, and to analyze the suitability of an innovative method of assessment by comparing the relations between self-assessment, peer-assessment by fellow students and hetero-assessment by the teacher. In order to do so, the students were asked to

create a video presentation (text, image and voice). The presentation was created with the use of the PowerPoint software. The video was made on the OpenMeetings server and subsequently uploaded to Babelium, where it was assessed in a collaborative way.

On one hand, the qualitative results obtained through the questionnaire filled in by the students and the comments made by the teacher, indicate that the experience related to the use of technological tools has met, to a satisfactory extent, the teaching-learning expectations of both the students and the teacher of the subject. We can say that the educational approach tested to develop and assess cross-curricular competencies, such as cooperation, teamwork, ability to learn independently, awareness of their learning process, others- and self-criticism, ability of dealing with new technologies, communication skills and creativity is adequate and effective. In the same way, the didactic experience was also satisfactory in terms of achieving curricular competencies, in this case, theoretical knowledge about different techniques of diagnosis in medical imaging, resulting in a better learning level than the one acquired following traditional methodologies, by comparison with the results obtained in past courses. On the other hand, the quantitative data produced by the correlation analysis of the assessments show that the self-assessment coincides reasonably with grades given by the group and with the ones provided by the teacher (taking into account the assessment strategy used by the teacher). We conclude that the collaborative assessment has been a viable and adequate method to evaluate the students, and that Babelium is a valid didactic tool to complete the task in question.

This first project on making online videos in the subject “Structure and Function of the Human Body I” opens up the possibility of incorporating this teaching model when planning this and other subjects undergoing adaptation, and encourages exploring new ways of working with new technologies. It has been noticed that such an environment favors a motivating workflow, promotes teamwork and self-study and enables simultaneous development of competencies specific to the subject and of cross-curricular competencies for overall learning experience. Indeed, as previously indicated, the highest-ranking aspects of the experiment include teamwork and, particularly, collaborative assessment, despite some difficulties and technical problems that students had to face with.

Even though it would certainly be possible to obtain good results by applying traditional methodology in in-class oral presentation, the use of computer-based tools has an implicit added value which circumvents the limitations of space and time when it comes to presentations and assessment as well as displaying the projects. Thus, the Babelium tool, apart from providing a new and effective online assessment method based not only on the teacher’s

opinion but also taking into account students' review, boasts the added advantage of offering a fast and efficient way of assessing students' oral expression, an aspect which is particularly expensive and difficult to deal with, but remains of great importance for the professional development of a nurse.

Nevertheless, we cannot forget that this is a novel experience that has been carried out just once and whose limitations must be taken into account. It is necessary to repeat similar experiences in the future in order to corroborate our findings and to go deeper in some questions that still remain unsolved. As McConville and Lane (2006) indicate, "...Technology Supported Learning provides persistent content - such as video recordings - that students can re-visit anytime, which in turn, help students to develop a greater understanding of the task involved". In this vein, one possibility online video-presentations offer that can be explored in future experiences -and that Babelium tool makes easy to work with- is the creation of a repository of multimedia teaching material for future students. This repository can compile the best (and worst) recordings and set them as an example of learning and teaching, possibly available not only for this subject, but also for other subjects, nursing schools, faculties and even universities.

As a summary, we can conclude that the mentioned didactic tools have provided a richer and learner-centered learning environment that contrast with the typical less interactive classroom environments relying on instructors, textbooks and lectures, and that the experience has been both successful and challenging, and worth expanding its possibilities.

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Table 1

Table 1.

Correlation between peer-assessment and self-assessment

	Peer-assessment			
Self-assessment	Ap	Bp	Cp	Total
As	2	4	0	6
Bs	3	3	0	6
Cs	1	11	2	14
Total	6	18	2	2

Table 2.

Correlation between peer-assessment and hetero-assessment

	Hetero-assessment			
Peer-assessment	Ah	Bh	Ch	Total
Ap	1	5	2	8
Bp	7	5	7	19
Cp	0	2	0	2
Total	8	12	9	29

Table 3.

Landis and Koch’s categorization of Kappa values

Kappa Statistic	Strength of Agreement
<0.00	Poor
0.00-0.20	Slight
0.21-0.40	Fair
0.41-0.60	Moderate
0.61-0.80	Substantial
0.81-1.00	Almost Perfect

Fig. 1. Stages of the experiment and technological tools applied
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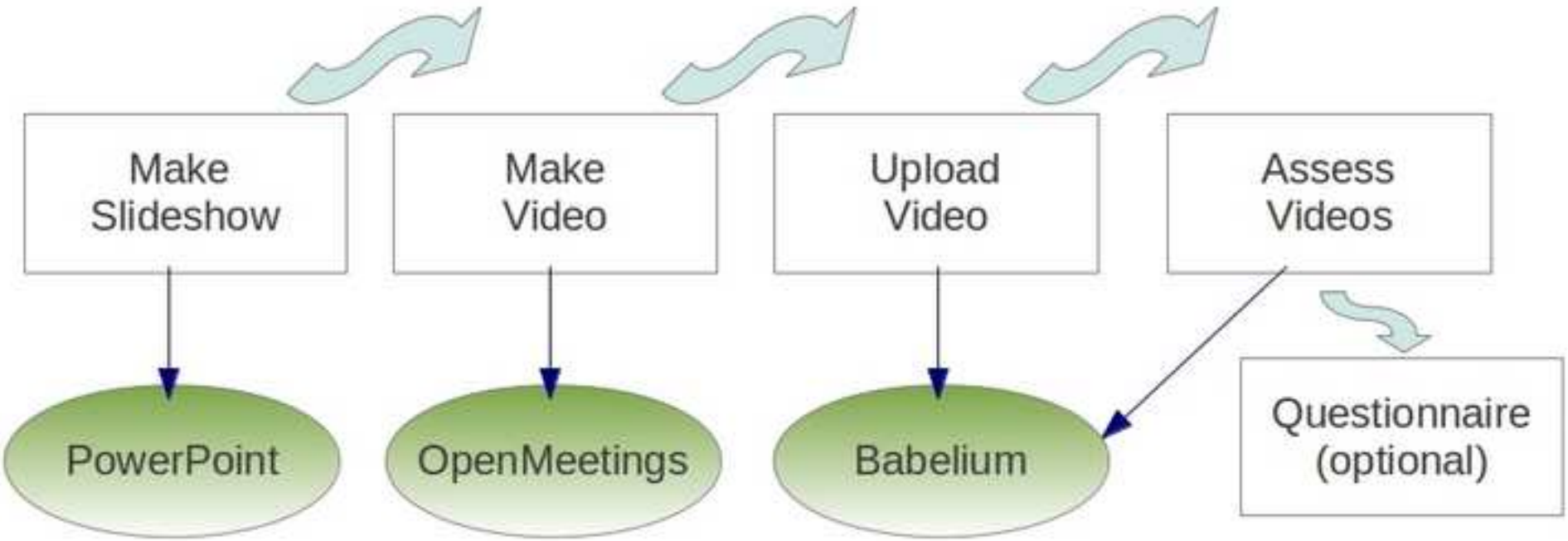

Fig. 2. An example of a video with embedded webcam image
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Fig. 3. Auto- vs. Peer- evaluations

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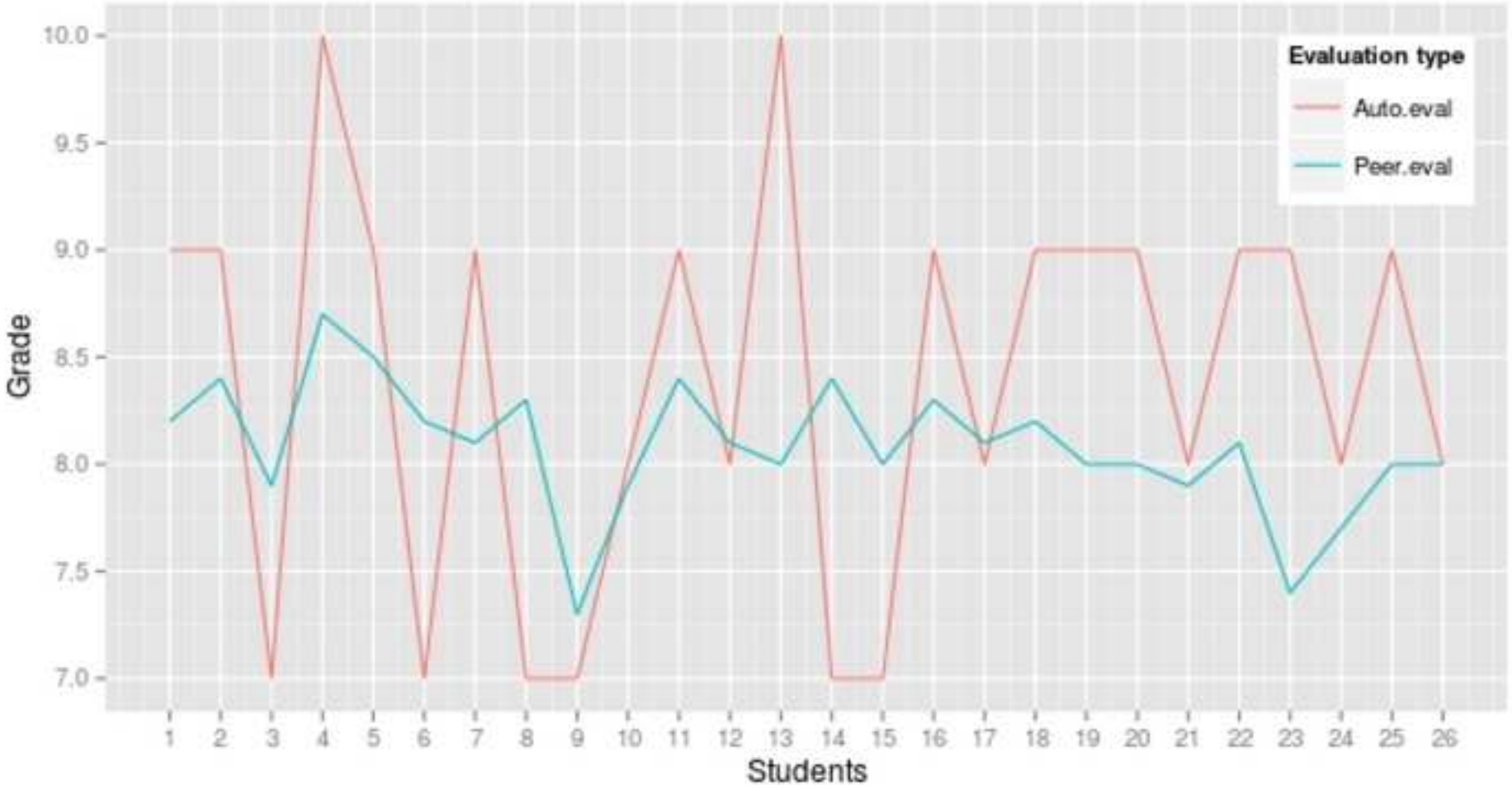

Fig. 4. Peer- vs. Teacher- evaluations

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