ARTICLE

Educational innovation through ICTs in the university setting. What do students think of these practices?

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Abstract

The aim of this article is to report on an experience undertaken by a group of students during the implementation of a programme targeting innovative students at the University of Valencia (UV), Spain. The current spread of technologies to all areas of society in general, and to education in particular, poses many unknowns about how these educational experiences are actually conducted. The aim of the project presented in the article was to get the students to do an assignment that would relate information and communication technologies (ICTs) to university learning contexts. The article therefore presents the experiences, the exchanges and, finally, the conclusions drawn on completion of the project.

Keywords

information technologies, active learning, cooperative learning, educational innovation

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La innovación educativa en la universidad a través de las TIC. ¿Qué ven los alumnos con estas prácticas?

Resumen

Este documento pretende dar a conocer la experiencia llevada a cabo por un grupo de estudiantes durante el desarrollo de un programa destinado a alumnos innovadores de la Universidad de Valencia. La actual inmersión de las tecnologías en todos los ámbitos de la sociedad y en la educación plantea nuevas incógnitas sobre cómo se desarrollan estas experiencias educativas. El proyecto presentado estaba enfocado a los alumnos con vistas a desarrollar un trabajo que relacionara las tecnologías de la información y la comunicación (TIC) con los contextos de aprendizaje universitarios. De este modo, en el artículo se presentan las experiencias, vivencias y conclusiones a las que se ha llegado una vez terminado el proyecto.

Palabras clave

tecnologías de la información, aprendizaje activo, aprendizaje cooperativo, innovación educativa

Introduction

The following experience came about as a result of a University of Valencia (UV) programme aimed at fostering groups of innovative students through the use of information and communication technologies (ICTs). Since technologies were first integrated into education in the late 1990s/early 2000s, the academic world has been wondering what role such integration plays in the classroom.

This article examines the students' points of view and feelings when it comes to dealing with this kind of educational innovation, when they are the ones who have to take an active attitude towards learning. By becoming aware of their interests and points of view, we can adjust class content to suit their realities as well as learn how to understand such experiences.

The aim of this article is to report on what the students perceive, what they think about these methods, and how they consider that the educational applications of these technological tools might be improved.

Educational innovation and ICTs

Human beings do not learn naturally, but instead need a reference framework as a basis for learning. Sociocultural theory (Vygotsky, 2000) emphasises the fact that social relationships between human beings, especially language and communication, help children learn through interaction with their peers, with their surrounding culture and with the physical objects that they possess in order to create learning. We therefore need a sociocultural framework that is capable of providing us with significant tools to help us create learning.

Technological development and the advent of information and communication technologies (ICTs) in recent years has helped to construct learning based on these tools, which has generated a degree

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of interest within the academic world in integrating such technologies into teaching and learning processes. Thus, the direction that educational innovation has taken has been clearly influenced by ICTs. Many experiences in which technologies have played a fundamental role as an educational tool can be found in the current scientific literature. However, simply applying such technologies as tools is no guarantee that they will improve or offer anything new to the teaching-learning process (Suarez, 2010). Rather, their use must be based on a scientific corpus that supports their application.

Thus, as Epper (2004) has suggested, technologies at the service of education must endeavour to shift the centre of attention towards students so that they can learn by doing, by talking to others and by sharing their experiences and information, and not simply be spectators of a reality unfurling before their eyes. In other words, the development that students experience should be more important than the results they are able to achieve. In addition, it should be done in a way that enables students to interact with each other in order to construct shared knowledge.

However, students alone can do very little if their lecturers do not adapt their educational practices by introducing ICTs into the classroom. To facilitate greater student participation in class, lecturers must integrate not only the different uses of technologies, but also methods that help to establish a continuous, multidirectional education and allow for the hybridisation of face-to-face and distance learning (Duart, 2011).

Some authors have even suggested that the application of ICTs to teaching processes has been an educational paradigm shift, firstly because it means that students have gained responsibility for their own educational processes, and secondly because it has broken down the highly hierarchical structure in which lecturers were the protagonists (López-Meneses & Martín Sánchez, 2009).

However, the processes of innovation through ICTs that have been implemented in university institutions have tended to focus on the translation of materials and tools into digital formats. That is to say, most curricular materials have been digitised without transforming the foundations of the dominant educational paradigm (Bates, 2009; Bates & Poole, 2003).

Most of the studies published on student-centred educational innovation through ICTs have tried to quantify the time, types of use or changes observed through academic results (Coutinho, 2007; Valerio-Ureña & Valenzuela-González, 2011; Papastergiou, Gerodimos & Antoniou, 2011; Antolín, Molina, Villamón, Devís-Devís & Pérez-Samaniego, 2011).

The majority of the studies have concluded that students acquire more and better usage and processing skills with regard to both the tools and the information that they handle (Sim & Hew, 2010). In contrast, other authors have asserted that there are no differences in learning between the use and non-use of technological tools in formal educational contexts (Papastergiou et al., 2011) owing to the fact that virtual learning environments (VLEs) have been applied without changing the traditional method, and that they are being used as a tool at the service of traditional education without changing the logic of education (Bates, 2009).

In short, depending on how such tools are used and what orientation lecturers give to them, we find that there is a continuum of possibilities insofar as educational practices are concerned. On the one hand, we find practices that promote the students' active learning, with information multidirectionality and lecturers as knowledge guides. On the other, we find more traditional learning based on observation and repetition, with lecturers as knowledge custodians.

To sum up, ICTs can facilitate the adoption of strategies that are more in keeping with the paradigm shift and innovation, but they alone will never be a reason for change. In other words, their use does not guarantee that a change will take place, but the way we use them will indeed foster that change.

This article therefore aims to give an insight into how to integrate ICTs into university learning environments through an educational experience designed to seek that integration through innovative methods and models. To that end, we shall give an account of the experience undertaken by one of the innovation groups.

The ESTIC programme

We students rarely have the opportunity to express our views in the scientific sphere about our feelings and experiences through the educational innovation that is centred on us. The few occasions in which we have been the protagonists are usually recounted by others; we students have never given an account of our own experiences.

We therefore propose to recount our experience of educational innovation through ICTs by means of a student immersion programme in this field implemented by the Educational Innovation Unit (UdIE) at the UV. This educational innovation programme aims to foster educational innovation through the students' active participation, and it is called the ESTIC Programme for innovative students. The first programme was implemented in the 2009/2010 academic year. At the time of writing, there had been four editions of it. The experience we are presenting here corresponds to the 2011/2012 academic year. Since then, new editions of the programme have continued to be implemented.

The programme aims to integrate methods based on cooperative learning, educational innovation and ICTs so that we students can get a feel for these practices and propose our own way of learning. Thus, the students had to form groups of between five and eight people (male and female) and develop an innovative idea in relation to the content of any course subject. The project that had to be developed could expand on or enable a better understanding of the subjects so that our fellow students and we would be able to develop our own knowledge of the subject covered.

The programme was for students enrolled in the 2011/2012 academic year on any of the degree courses offered at the university. The call for applications was therefore open to students on bachelor's and master's degree courses. The only ones excluded were those enrolled on the research phase of the doctoral programme.

There were two options for this project. One was cross-disciplinary, that is to say, focusing on several subjects with objectives or content that, because of their topics, could be interlinked. The other was to focus on a single topic.

The lecturers' involvement was not compulsory, but it was necessary to inform the tutors of the respective subjects that an ESTIC project was going to be undertaken. The lecturers could take part voluntarily in those projects, though because of the way they were run, neither their participation nor supervision was required.

The programme offered by the UdIE was divided into two calls for applications: one for the first semester and one for the second. However, the subjects could be either annual or semestral, and the project period was linked to the duration of those subjects.

The ultimate goal of the programme was to get the students to create a blog, a website, a social network profile or a wiki with the aim of sharing it with their fellow students and creating a common space for interaction between them so that they could get a better understanding of the subject content and cooperatively create new content (Vicerrectorado de Cultura, Igualdad y Planificación, 2011).

The subjects chosen belonged to the master's degree in Research and Intervention in Physical Activity and Sports Sciences at the university. This master's degree course is part of the training that works towards gaining a doctorate. The subjects chosen were Applied Research I and Applied Research II. For both subjects, the intention was to provide the students with training on practical research examples from each of the relevant physical activity and sport areas.

These subjects belonged to the second academic semester, though it should be noted that the master's degree course we were taking was organised into modules, and that these were organised differently from the subject-related academic planning on the bachelor's degree courses, as the start and end dates corresponded to a different period.

Finally, the project that we undertook was for a competition involving all the projects submitted by the students, where the best ones received an award. Thus, a reward in kind was given to the best assignment in each knowledge area of the respective course branches. These were Social and Legal Sciences, Health Sciences, Arts and Humanities, and Engineering.

Method

A case study and autoethnography method was used in this project. The case was the group in which the experience was undertaken, and the autoethnography was that of one of the participants, specifically the innovation group coordinator. This method was chosen for several reasons. The first was the minimal validity that a quantitative study would have provided us with, as the sample was very small and the data obtained and analysed would have lacked validity. The second was the greater precision that this method offers when it is a matter of presenting the exchanges and experiences of a student innovation group, that is to say, the students' feelings and opinions regarding the learning process. The choice of ethnography as a research method has a methodological limitation in that it does not anticipate going beyond simply describing the experience and presenting the ESTIC programme; sessions are usually recorded and transcribed when using this method, but neither were done in this case.

Our group was formed by six students, all of whom were male. We tried to get some of our female classmates involved, but they did not want to take part. All of the group members were graduates in Physical Activity and Sports Sciences, as that was a requirement to take the master's degree course. The members' ages ranged from 24 to 31 years.

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Three of the members were from Valencia, and the three remaining members had come from different places in Spain to do their postgraduate studies: Zamora, Alicante and Murcia.

The meeting minutes were used as a data collection instrument. At the meetings, the members were asked about the personal perceptions and feelings they had had throughout the project, and particularly in the last self-assessment session held on completion of the project.

The focus groups created were completely open in all sessions apart from the self-assessment one, which had a semi-directed structure, for which a series of key questions for the assessment had been put together. The discussions that arose in these focus groups were not recorded on any medium because the initial idea only anticipated creating the innovation project and not writing up and communicating our experience in scientific circles. It was only later, when the group decided to give visibility to the project by disseminating it, that the collected data were used. Despite not having recorded the group discussions, the data contained in the meeting minutes were collected and subsequently analysed. In addition, the final report that we had planned to deliver to explain the rationale for our project was used and analysed.

To assess and analyse the results obtained in the course of our project, we used the last planned session as a self-assessment session to capture the feelings and perceptions that each of the group members had had. This session had a semi-directed structure and, for discussion purposes, questions were posed about the group's operation, the group members' perceptions of the cooperative work carried out, the learning attained through this method, and the strengths and weaknesses found. This was a group session, and it was held on completion of the project, prior to the submission of the final report to the body that had issued the programme's call for applications.

Our educational experience through ICTs

Firstly, we should point out that we students used different technological media to develop our project. Our main objective from the start was to create an educational blog enabling students, like us, taking the master's degree course to have a common space for interaction outside of the classroom. This blog was designed using the Google® Blogger system.

We also aimed to create concept maps from the knowledge acquired in class to help us get a clear, simple understanding of the concepts learnt. To create and develop the concept maps, we used Visual Understanding Environment (VUE), which is a free, open source application that allowed us to produce and share our concept maps.

The idea behind the project was to enable all students to take part, and not just the members of the innovation group. When we told our fellow students about our project and what we intended to achieve by doing it, their response was one of indifference because this assignment and the time invested in it would not improve their grades.

We also used other technologies to organise, manage and internally communicate within the group. Besides the blog, these media included instant messaging applications on mobile phones (WhatsApp), a cloud storage and file exchange system (Dropbox) and e-mail.

This use of multiple technologies served to make us aware of and use all of the tools as effectively as possible, and enabled us to apply them to an educational context. However, it should be noted that, with the exception of the blog and Dropbox, the tools were used as means of management and communication but were not an active part of our formal learning within the context of the Research master's degree course.

In terms of the blog and Dropbox, the feeling perceived by the students was different. Regarding the blog, it helped us think about and discuss issues concerning the content of the master's degree course that could not otherwise have been covered in a face-to-face context. Regarding Dropbox, it allowed us to revise and expand the concept maps that we had cooperatively created, as we were able to review and assess both our own work and that of our fellow students through this tool.

Finally, and in a context not unlike that of an open access journal, the project led to a situation where the concept maps were the materials that had to be reviewed and the group members were the reviewers. A deadline of 15 days was set for the review, which could be either anonymous or signed. The review was done on the original document, and changes and comments were added at the end of the document for it to be revised.

Social networks were also used to give visibility to the project and to try and disseminate it and our results as widely as possible. This tool allowed us to disseminate our work, but did not involve the use of the networks themselves as content.

When it came to creating the concept maps for the content and topics covered in class, the group functioned via an 'expert group'. In this type of organisation, those members with the greatest affinity to the topic covered in class constructed an initial concept map that was then shared with the other members. After being reviewed, the map was revised and then submitted to the other fellow students for assessment.

Regarding the materials and resources used to undertake the project, it should be pointed out that we exclusively resorted to our own personal computers and to everything that could be downloaded to them. We used free software to create the concept maps and the blog, and to exchange files. Our project was also developed under the Creative Commons 3.0 licence, as the ESTIC programme demands that participants share the created content freely while retaining basic attribution, sharing and remixing rights (for non-commercial purposes).

Regarding the infrastructure used by the group, it was limited to the faculty's lending of classrooms. This lending of classrooms allowed us to have a physical space to hold coordination meetings, especially at the beginning of the project, to organise the group's operation and run training sessions on the Web tools with which the members were unfamiliar.

Results

Firstly, the topics that arose during the assessment session were as follows (as contained in the minutes):

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- Data use and processing
- Use of different digital tools
- Interactions in the group's communication process
- Writing and reflection process
- Objectives of the master's degree course
- Project duration
- Engagement of fellow students on the master's degree course
- Cooperative learning

In this discussion process, the skills acquired in the course of the project, referring to data processing and the use of different technological tools, were rated very positively by the group, as some of the participants had been unaware of the programmes used and had discovered new applications that might be of help to them in other aspects of their lives. For example, Juan[1] commented that he would use concept maps with his football team players to explain techniques and tactics because, as contained in the minutes, he felt that it was a more visual way of doing so.

The skills acquired in terms of the social communication achieved within the group were rated positively by the group, though Juan considered that Alex (the group coordinator) should have done more to improve communication and the atmosphere within the group. The writing, reflection and review process that we implemented to create the concept maps was very useful according to Esteban, as he had enjoyed the revision process applied to the maps.

The fact that some of the objectives set in the master's degree teaching programme had been attained by using these tools was rated positively by the group. The technological tools used, together with an organisation that was oriented towards things of interest to us had helped us attain the objectives set in the project. According to the comment made by Luis, the simulation of the review and publication process that we applied to the maps tied in with the knowledge creation and dissemination objectives. Both Alex and Luis felt that the other fellow students on the master's degree course had less grasp of these types of content than the members of our group.

In contrast, the whole group agreed that the shortness of the project had turned out to be a limitation, and it was commented that a longer project would have allowed the knowledge and skills acquired to be consolidated and a better understanding to be had of the content and objectives set.

Alfredo commented that he had perceived a lack of engagement of fellow students on the master's degree course in the project content, because nobody had taken an interest in it and because the group members were the only ones that had used it. Juan pointed out that up until exam time, none of the fellow students had asked anything, but afterwards nearly all of them had begun to download the concept maps that we had created. Thus, a substantial increase in the number of downloads and in our fellow students' level of interest was found at that time. Their interest was expressed in the form of direct questions about the project and its goals.

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1. Pseudonym. All the names appearing in this article from this point onwards are fictitious, thus safeguarding anonymity.

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Alex also commented that little advantage had been taken of the virtues of cooperative learning, despite the fact that it had been set as an objective within the ESTIC. The reasons for this were a lack of experience in projects of this type, the minimal sense of group that had been generated, and the impossibility of transferring this method outside the group because of the scant participation of both the teaching staff and fellow students. Nevertheless, Juan and Esteban commented that they felt that the project had been more of an introduction to this type of proposal, and considered that a better understanding of certain aspects of this type of learning had been gained.

Discussion

The skills that the group members said they had acquired are in keeping with those noted by other authors (Bates, 2009; Papastergiou et al. 2011; Top, 2012), namely social skills and information processing skills that students develop in technology-mediated educational contexts. Therefore, we can assert that when integrated into a formative context, these tools enable students to interact with each other in order to construct shared knowledge (Vygotsky, 1978).

As explained by educational theories, when students are actively engaged in their own learning, better teaching results are achieved, with greater intensity and depth, thus allowing them to use the knowledge learnt in areas beyond their academic exams (Epper, 2004). This is evident from the comments referring to the assimilated objectives of the master's degree course.

As explained by Sim and Hew (2010), the fact that many of these tools' applications only tend to exist for short periods of time in educational contexts makes it impossible to develop their full potential, thus limiting the benefits that can be had from these practices. Thus, the group's comments suggest that there appears to be a need to develop programs that enable educational projects of this type to be extended so that the results can be maximised.

In the published works by Brown (2005), and Ching and Hsu (2011) on student assessment, it was concluded that for students to engage in activities or tasks connected with their education, such tasks had to be assessed and counted as class content because participation otherwise tended to be very low. That is what happened in our project. As the concept maps that we created did not have any impact on the master's degree grade, it was not until the arrival of the exam period that our fellow students became interested in our work.

According to the students' comments, the project was valued as an introduction to cooperative learning, as proposed by Velázquez (2010), Slavin (1990) and Coutinho (2007). However, as already mentioned, the lack of time and the little amount of experience of these methods represented a limitation in terms of wholly applying them so as to take advantage of their full potential. We therefore consider it expedient to foster a formal educational practice that integrates these methods in order to ensure that, in the future, students become capable of using these mechanisms to solve comprehensive, complex problems.

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Conclusions

From our findings, we drew the following conclusions:

- Projects of this type foster the students' active participation and engagement in their own learning; assignments of this type should therefore be implemented in a planned manner in the curricular programme.
- Project duration should be much longer and allow the potential benefits that ICTs offer – as the methods employed – to emerge and develop.
- Initiatives of this type should be assessed and rewarded so that the students feel compensated for the effort put into these self-directed practices and become interested in them.
- The development of these programmes and projects must have the backing of the educational institutions that the students attend, with the aim of valuing the work they do outside the classroom.
- The skills and abilities acquired by the students are crucial to their development in technology-mediated contexts that are an integral part of the information era; they are therefore crucial to their future competencies.

Note: The project blog address is http://masterinv2012.blogspot.com.es.

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