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Conceptions of Teaching using Virtual Learning Environments: Preliminary Findings From A Phenomenographic Inquiry

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Abstract

This paper reports a sub-set of findings from a phenomenographic investigation into Greek university teachers' conceptions of, and approaches to, teaching and learning using virtual learning environments (VLEs). Analysis of open-ended interviews with a small group of computer science teachers revealed three qualitatively different conceptions of teaching using VLEs, and different pedagogical approaches associated with them. The 'information transfer' conception was associated with information- (or content) - oriented pedagogical approaches to using VLEs. 'Understanding concepts' and 'developing concepts' conceptions were associated with more activity- (or process-) oriented approaches. The data suggest that there may be a relationship between the subject being taught (within the broad discipline of computer science) and different conceptions and approaches to using VLEs. Although based on a very small sample, the pilot study also suggests that pedagogical conceptions and approaches associated with networked learning may not be widely prevalent in computer science teaching in Greece.

Keywords

Phenomenography, Virtual Learning Environments, Higher Education, Greece

Introduction

This paper reports a sub-set of findings from an in-depth, phenomenographic study of Greek university teachers' conceptions of, and approaches to, the use of virtual learning environments (VLEs) such as WebCT, Blackboard or Moodle in teaching. The project is investigating the relationship between computer science teachers' conceptions of, and approaches to, teaching using VLEs and theoretical perspectives of relevance to the e-learning field, in particular those that are associated with the principles and practices of networked learning as a distinctive form of e-learning (Goodyear, 2003; Levy, 2006). The paper presents findings from a small-scale pilot study. It concludes by suggesting possible implications for the further development of networked learning practice in the discipline of computer science in Greek higher education.

Prior research and theoretical background

The rapid development of ICTs is having significant impact on teaching and learning in universities in Greece as in the wider international context. In the Greek context, international ICT policies mediated by the state are influential in institutional implementations (Kokosalakis, 2001). The use of ICTs in Greek HE encompasses many different kinds of software tools, including VLEs. However, there is a tendency for both development and research initiatives to focus mainly on the technological aspects of the various software applications, rather than on pedagogical issues. Consequently, the use of VLEs (and other e-learning applications) in Greek universities is being taken forward principally by individual academics'

enthusiasm to enhance their practice and is based on personal perceptions about pedagogical practice rather than on research-informed development activity.

The theoretical background to this study includes previous phenomenographic research that has explored university teachers' conceptions of, and approaches to, teaching in different discipline areas (e.g. Prosser et al., 1994; Prosser and Trigwell, 1999). In a review of thirteen such studies, Kember (1997) notes that while there are some differences in terminology, there is also a high level of agreement on findings, in that most findings converge on five conceptions of teaching which can be located on a continuum from a teacher-centered, content-oriented conception to a student-centered and learning-oriented conception of teaching. These are:

- Teaching as imparting information
- Teaching as transmitting structured knowledge
- Teaching as an interaction between the student and the teacher
- Teaching as facilitating understanding on the part of the student
- Teaching as bringing about conceptual change and intellectual development in the student

Previous qualitative research into university teachers' use of ICTs includes investigations of academics' educational beliefs and intentions as related to learning technology, for example using grounded theory. There has been some, but relatively little, phenomenographic work (e.g. Roberts, 2003). Roberts investigated academics' conceptions of, and approaches to, using the web, firstly using a survey and then a phenomenographic approach. This study identified two distinct orientations focusing on "efficiency" and "effectiveness" respectively, and suggested that networked learning approaches would be more likely to be adopted by teachers whose conceptions and motivations are more oriented towards learning facilitation than resource efficiency.

Research indicates that teachers often hold more than one conception of (and approach to) teaching and that these are influenced by factors such as the cultural and educational environment, technical expertise and staff development opportunities. The ways in which teachers conceive of teaching are likely to be reflected in the way they use ICTs (e.g. as an information bank, or for dialogue in peer learning communities). The relationship between conceptions of teaching and how VLE tools are used is being explored in this research, in the specific cultural context of Greek HE.

Research approach

A phenomenographic research approach is being adopted for this study. Phenomenography is an interpretive approach that seeks to identify the range of variation in ways of perceiving or experiencing a phenomenon of interest (Marton and Booth, 1997), in this case the way in which Greek university teachers understand the educational use of VLEs.

For the pilot study, the sample included 5 computer science academics from 3 universities in Greece. All had been using VLEs in their courses over a period of 1 to 5 years. The interviews (generally 30-40 minutes) concentrated on seeking variations in pedagogical purposes in using VLEs for teaching and learning, and in approaches to their use. The interview questions were open-ended and were developed broadly as follows:

1. Please can you describe how you use the VLE in your teaching?
2. What are you trying to achieve in using the VLE?
3. What do you see as the value of the VLE for teaching and learning?
4. How do you help your students to learn with the use of the VLE?

The accepted procedure in a phenomenographic data analysis is to use an iterative process to investigate the relation between meaning (how the phenomenon is experienced) and structure (different ways of experiencing). To identify this relation in this pilot study, a four phase analysis procedure was used based on Marton and Booth's (1997) and Bruce's (1997) processes of analysis. These phases were:

Becoming familiar with the transcripts: The set of accounts extracted from the interviews were read and re-read several times before any attempt to begin the formal analysis.

Identifying meanings: In addition to the work already done in highlighting key themes and potential variations, the transcripts were loaded into Atlas/TI qualitative analysis software for textual analysis.

Structuring experiences: The outcome of this phase was ‘categories of description’. There was a focus on discerning what was in the foreground and background of teachers’ awareness in relation to different conceptions. Dimensions of variation emerged that consisted of a number of themes that existed in all categories, but were experienced in qualitatively different ways in each different category.

Establishing the outcome space: This phase involved arranging the categories of description into a logical structure, representing both the meaning and structural aspects.

Findings

This section describes teaching and learning using VLEs as conceived by the 5 academics who participated in the pilot study, and the pedagogical approaches associated with different conceptions. Three primary categories were identified along with a number of subcategories. All three categories describe the use of VLEs for teaching and learning as it is seen, experienced or understood by teachers of computer science.

Category 1 Information transfer

- Providing information
- Developing information
- Clarifying information

Category 2 Understanding concepts

- Understanding the topic
- Rethinking the topic

Category 3 Developing concepts

- Developing the topic

Each category is accompanied by a figure depicting the awareness structure where a number of broad areas of focus are presented, some in the foreground and some in the background. In this pilot study, these areas of focus consisted of information, technology, concepts and interacting.

The categories have been illustrated with quotes from the transcripts, referenced as Academic 01 to Academic 05. In relation to each conception, a number of factors, or dimensions of variation as phenomenography terms them, have been identified and described: focus on teaching, focus on learning, role of the teacher, role of the student, focus on use and focus on context.

Category 1 Information transfer

The focus is on providing learning content through an information repository, and on directing students to subject information located in various websites. VLEs are also used for providing subject information located in course slides, ebooks, web sites online exercises, online tests etc or administrative information such as course announcements. Transferring information consists of three sub-categories: **(1) Providing information (2) Developing information and (3) Clarifying information.**

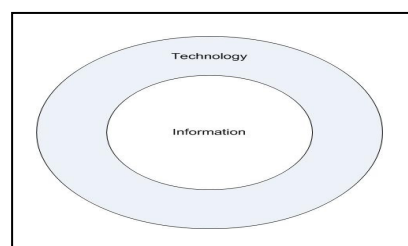


Figure 1: Structure of Awareness

Information (content) is the primary focus of awareness, and the technology fulfils the purpose of transmitting information in terms of provision of access to exercises, online tests and lecture notes (see figure 1). This may mean that teachers perceive these resources as ‘information’ in terms of storing them

to the VLE for students to access and retrieve them rather than to provide interactive feedback by solving online tests or to engage students in a discussion activity where lecturing notes will be further explained and discussed. Therefore, the focus is on directing students to relevant information without focusing on creating any kind of learning interactions.

Subcategory A: Providing Information

This subcategory describes the online provision of information created to be used off-line first, for supporting face-to-face lectures and other in-class activities. Teachers saw providing this information as a means to ensure coverage of subject matter. It was also highlighted that by using an information repository, students could conveniently access course material beyond the classroom context. Teachers' conceptions of using VLEs are, therefore, directed towards content-focused features and perceived benefits of the VLE.

... as an information means with students in a sense of loading up material that is being used during the course like Powerpoint slides, exercises, exercise notifications when the deadline has passed etc, for being aware of the subject matter that needs to be covered (Academic 01)

Subcategory B: Extending information

Teachers identified the importance of providing extended information, such as giving links to particular websites and including eBooks, in contrast with subcategory A. These learning resources were for on-line use as they were perceived as substantial source of information that could be used to provide access to content not presented during class because of time constraints. Also, the extension of learning content was perceived as significant because the student would not have the opportunity to ask for explanations since the teacher would not be present when the student is accessing the information:

...for the material that I am uploading, at least I am trying to be as clear and understandable as possible by including further explanations, further examples and less complex meanings. I think this is the purpose of enhancing material (Academic, 05)

Subcategory C: Clarifying information

In this subcategory, the VLE was perceived to be useful for providing explanations of small points that were perceived to be important for performing well in assessments. Clarification of information was not accomplished only by the teacher but also by students who could exchange learning content through the use of a bulletin board, to help peers to clarify 'minor' points of information. This process was felt to be important in terms of clarifying transferred information provided both in online resources and in-class for creating a mutual solidarity between students.

a student may ask his peer to help him with this file or what this exercise says etc he was creating a question and the others were answering this question... mostly the forum was used for resolving simple questions and this was good for creating solidarity between students (Academic, 01)

Dimensions of variation

Focus on teaching

As described earlier, teaching using VLEs is represented in participants' statements as imparting information.

Focus on learning

Teachers saw learning via VLEs in terms of accessing clearer and richer information.

Role of the teacher

Teachers felt that they had an administrative role in terms of directing students to learning resources and a further role in terms of providing clarification of information.

Role of the student

The role of the student was perceived as using the VLE for receiving subject information which would help the student to grasp and memorise concepts.

Focus on use

Teachers conceived of the VLE as a means of providing access to, or clarification of, content. They approached the use of technology as supportive to face-to-face teaching.

Focus on Context

The contextual focus was on providing information, through the use of the VLE, for passing the course.

Category 2: Understanding concepts

The primary focus of awareness is on students' ability to understand both the general concepts of the course (i.e. understanding the holistic issues of a module, e.g. principles underpinning programming) and meanings related to a particular topic (i.e. understanding specific definitions and principles, e.g. of a specific programming language). Information provision is a secondary focus, and technology is in the background. The use of the VLE is experienced as a medium for facilitating understanding rather than provision of access to material as in Category 1. It was seen as a medium for supporting subject analysis through expressing opinions and ideas, resulting in learning. Engaging students in online discussions was perceived as a way to motivate and increase student participation in this process in comparison with face-to-face discussions. Understanding concepts has two sub-categories: **understanding the topic**, and **rethinking the topic**.

Subcategory A: Understanding the topic

This sub-category focuses on the ability of students to engage with and understand the structured meanings of the subject. Approaches to using the VLE include providing feedback via emails, triggering students' interest by explaining concepts using various tools of the VLE (e.g. whiteboards, Web links,) and monitoring progress through online tests and quizzes:

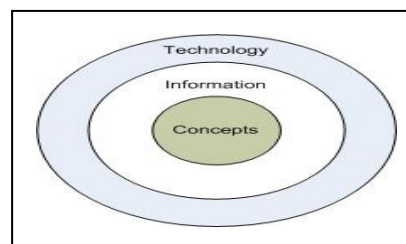


Figure 2: Structure of Awareness

...my effort is to keep the interest of my students alive around the meaning of my subjects [...] if it is needed to show it in detail in slides or demonstrating it through the VLE while they are working with a particular software (Academic 03)

Sometimes I prepare to [the VLE] some tests for formative evaluation that the students want in order to have a hint on where they stand (Academic, 04)

Subcategory B: Rethinking the topic

In this sub-category the VLE is used to help students reflect on the topic by applying theoretical concepts in online exercises, and by developing awareness of how other students conceive the same issues. For some, online discussions were perceived as useful in conjunction with face-to-face, for students to further explore previously expressed ideas and opinions (off-line) and feed in to further offline discussions.

Each student can see particular meanings from other students and therefore, a more complete learning experience is created through historical references (Academic, 03)

Dimensions of variation

Focus on teaching

Teaching using VLEs is represented as transmitting structured knowledge, for example in terms of explaining concepts through giving feedback.

Focus on learning

Teachers saw learning via VLEs in terms of providing a medium for reflection on concepts and access to feedback.

Role of the teacher

Teachers felt they had a role in helping the student to understand concepts and in organising the online learning environment to ensure it included opportunities for access to content, online questions, provision of feedback and online exercises.

Role of the student

The role of the student was perceived as using the VLE to individually construct meaning for understanding the topic.

Focus on use

Using the VLE for provision of information was not a primary concern. Teachers conceived of the VLE as a means of engaging students in interactions of various kinds that would provide feedback. The VLE was seen as a means of increasing participation in discussions in comparison with face-to-face interactions.

Focus on Context

The contextual focus was on using the VLE to promote greater, more holistic, understanding of the topic.

Category 3 Developing concepts

The primary focus of awareness is on students developing their own ideas and concepts by sharing and adding new ideas and opinions, and at the same time contributing to the development of the topic. Teachers' use of the VLE is primarily to enable students to interact with the teacher and peers. As in category 2, activities such as online discussions are used but the focus is on sharing and criticising ideas for developing concepts.. This category has one sub-category: **(1) Developing the topic**

I think that this is the only way to develop their thoughts, if you share because even if you are very clever if nobody knows what you know then you are alone, I mean students have to share... if you read what other people say maybe you get some ideas and say oh yes this is true and expand your ideas. (Academic, 02)

Subcategory A: Developing the topic

In this subcategory, teachers were using the VLE to help students to contribute and share opinions and ideas for developing the concepts of the topic. The VLE was used with the purpose of promoting 'sharing' interactions and reflection through discussions. To achieve that, the aim was to motivate students to participate in online discussions by posting interesting subjects.

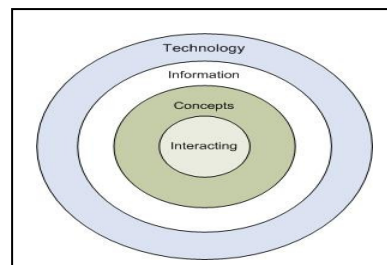


Figure 3: Structure of Awareness

...with a kick off point the discussion can direct you wherever you like (Academic, 04)

I think if it is really interesting for them, they will take part so that is why I have to see what is interesting for them I mean in the frame of the subject (Academic, 02)

Dimensions of Variation

Focus on Teaching

Teaching using VLEs is represented as facilitating further development of students' conceptions they already hold.

Focus on learning

Learning using VLEs is focused on students developing concepts and the topic by sharing opinions and ideas.

Role of the teacher

The teacher's role in the VLE is as participant in the environment as well as organiser, motivator and provider of information.

Role of the student

The role of students in using the VLE is as self-motivated explorer and developer of concepts which might also feed in to development of the module.

Focus on use

The VLE was conceived as a means of providing an environment for creating interactions for reflection and criticism. Using the VLE for and discussing about issues in more socially-focused subjects felt it was important for developing their concepts and the topic

Focus on Context

The contextual focus was on using the VLE to promote critical engagement with the topic and development of professional expertise for the workplace.

Discussion and conclusions

In the first category, conceptions of, and approaches to, the use of VLEs were based on information transfer and access - 'imparting information' in terms of Kember's (1997) typology. That is, teachers were directing students to relevant learning resources either firstly offline through the uploading of learning content or by recommending relevant Web sites where students could acquire information through online use. This content-oriented approach reflects an 'imparting information' conception of teaching as the VLE is used for presenting, memorising, and reviewing information that will enable quicker and better understanding.

In the second category, the conceptual focus is on using the VLE to enable students to understand a module's concepts. Teachers used the VLE for online exercises in applying theory to practice and for the provision of feedback in order to communicate structured information, or promote interaction between teacher and student, in Kember's (1997) terms. Online interaction is focused on provision of access to previous ideas and opinions.

In the third category, the conceptual focus is more on using the VLE to support personal meaning-making through social negotiation, perhaps more closely reflecting the principles of networked learning. The VLE is used for enabling learning relationships from the student perspective. The perception is that reflection and criticism could be developed by expressing and sharing views online. Presenting interesting subjects that would motivate students to share their opinions was regarded as an important pedagogical strategy. All of this may be consistent with a 'facilitating understanding' conception of teaching.

Taking into consideration previous research on conceptions of teaching using the Web (Roberts, 2003), there is broad consistency between the categories of description. In Robert's study, the "subject information" conception was identified as content-focused while the "self-paced learning" and "dialogue" conceptions were identified as more focused on learning processes. Similarly in this study, the "information transferring" conception was focused on provision of, and engagement with, subject information, while the "understanding concepts" and "developing concepts" conceptions were more oriented towards activity-based pedagogy. In the pilot study the 'transferring information' conception was more prevalent in the context of the teaching of more computational courses and the 'developing concepts' conception in the context of the teaching of more open-ended, socially-focused subjects. It may prove useful to further explore these associations in the full study, as it is possible that subject area may impact on the way in which the use of VLEs in teaching and learning is conceptualised and instantiated within the discipline of computer science. More generally, although based on a very small sample, the pilot study suggests that pedagogical conceptions and approaches associated with networked learning may not be widely prevalent in computer science teaching in Greece.

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