Pedagogical Conditions for Course Design in Network-supported Learning

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Abstract: Although Virtual Learning Environments (VLE) and other network-enhanced learning environments have been increasingly used for several years, there is no clear model for the educational process in this new setting. This paper proposes that the new learning environment contains so many new characteristics that a reengineering of the educational process is required. The paper also suggests a line of arguments to be used to derive the reengineering of the educational process by applying Bloom’s taxonomy of educational objectives to analyze the conditions of the new learning space.

Introduction

The Internet and Virtual Learning Environments (VLE) are increasingly being used for setting up both blended learning on-line courses, and actual on-line courses where the students work completely at a distance and without lectures or other kinds of face-to-face activities.

Often the courses are set up according to a model stemming from the “traditional” classroom setting, starting with face-to-face lectures on the main concepts and principles, and continuing at a distance with assignments and exercises, where the concepts and principles are to be elaborated and applied to practice. Doing so, the teacher often has the feeling of being forced to rush through the basics, whereas the students find it difficult to understand the basics during the dense lectures, and even harder to apply the basics in practice when working alone on an assignment, without the opportunity to discuss application strategies for the actual problem. The teacher may have used the course environment to provide source material, links etc., but still, the student is lacking the opportunity to ask questions, to discuss different views and to be reassured about having understood concepts correctly.

The situation described above is partly the result of the technological imperative and the technological determinism: since the technology is there we have to use it, and it will solve all our problems. The main reason for the problem described is that the teacher has not identified the new conditions formed by the changed characteristics in the technologically enhanced setting. The development is still in what Venkatraman calls the progressive stage, characterized by local use of technology to perform traditional tasks. The development has not yet moved on to the radical phase, which would include utilizing the conditions in a more efficient way (see Ferguson&Wilson 2001). In order to understand the source of the problem, we can take a bird’s eye view of the process in order to see the new conditions of the educational process, analyze them using the Bloom taxonomy as a framework, and ask the following questions:

- what levels of cognitive learning are we aiming at during the different phases of the process?
- what kinds of activities support the achievement of the desired level?
- how does the technologically enhanced setting change the conditions for different kinds of activities?

The Bloom taxonomy

Benjamin Bloom’s (1972) taxonomy is one of the most widely used tools for describing educational objectives and its usefulness has been confirmed during more than 40 years of research. Moving from the superficial level of knowing towards the profound levels of being able to evaluate and synthesize requires reflection which, in turn, requires time. Reflection cannot be speeded up, and thus - although the e-learning hype perhaps gave the impression

of speed and efficiency – we have to realize that there are no shortcuts to profound learning, which will always require time and personal effort.

Figure 1. The Bloom taxonomy: the more profound the level of knowledge, the more personal it is and the more time reaching it requires.

The superficial level of knowledge is rather impersonal, whereas the more profound the knowledge is, the more personal it is. At the superficial level, the emphasis is on memorizing and recalling, whereas the profound levels require the knowledge to be constructed and integrated into a functional part of the personal body of knowledge, interconnected to previous knowledge. The superficial level of knowledge does not necessarily require interaction, but rather an effective technique of memorizing facts. The reflective process of deepening the knowledge level can be considerably supported by interaction and collaboration, where the learners can test their understanding against each other, argument their standpoints, exchange views and thereby elaborate the topic to widen and deepen their understanding of it.

The learning space
In the classroom setting – the local space – the learning space is a clearly delimited space that allows both one-way and two-way communication as well as verbal and non-verbal communication, and where the teacher has a good control of the situation. The traditional distance learning setting is a remote concrete space with tools such as letters, cassettes and videos, radio- and TV-broadcasts. This remote space hardly allows any two-way communication, nor does the teacher have the tools to control the students’ activities. The remote concrete space allows some interaction, but as distance grows the opportunities for interaction cease.

Figure 2. The remote virtual space allows interaction to a greater extent than the remote concrete space.

The Virtual Learning Environments and other network-enhanced tools provide us with a quite new kind of space – a remote virtual space with new and different features and characteristics compared to the earlier remote concrete space. The virtual – or the network-enhanced – learning space contains tools e.g. for document sharing, collaboration, discussions, videoconferencing and simulations. These new tools often work in both a synchronous and an asynchronous mode, and allow activities and interaction that would not have been possible in the remote concrete space. In fact, even at a large distance in the remote virtual space, the possibilities of interaction still prevail. However, compared to a face-to-face setting, the quality of communication and interaction can be lower
because it is less fluent owing to the textual and/or asynchronous mode, and because of the lack of the nonverbal dimension.

The new characteristics and conditions of the network-enhanced learning space are the very factors that urge us to reconsider and reengineer the educational process in order to be able to move from the progressive to the radical phase of development (Ferguson & Wilson 2001).

Reengineering the educational process

Having stated that deepening the knowledge level is supported by interactive and collaborative activities, and that the network-enhanced learning space allows these activities to a much wider extent than the traditional setting, we can start reengineering the educational process by applying the new tools to the Bloom taxonomy as illustrated in Fig. 3 below.

![Figure 3. Teaching should make better use of the opportunities for interaction provided by the network-enhanced environment.](image)

By combining the new characteristics of the learning space with the learning objectives, the following conclusions can be derived about the educational process and the space where it takes place:

- since the (remote) network-enhanced learning space allows a much wider degree of communication and interaction, it can also be used over a much wider range of the learning process compared to the remote concrete space
- since deeper levels of learning are strongly supported by interaction, learning spaces and learning situations that allow interaction should be reserved for deeper levels of learning
- accordingly, learning spaces and learning situations that allow interaction should not be wasted on the superficial levels of learning, but instead, the remote concrete space should be used to a wider extent for this level
- learning spaces and learning situations that allow qualitatively better communication and interaction should be reserved for the deeper levels of learning.

Conclusion

Following the conclusions above can help determine the optimal space for each part of the learning process, if we also bear in mind that e.g. during a course, the level of cognitive learning should develop from a superficial towards a deeper level, but also that each topic inside a course can require the same development process. Hence, optimal use of the different spaces will require a dynamic and not necessarily linear use of different spaces during different phases of the educational process, a strategy already used e.g. within problem-based learning. A further area of investigation would be to use the line of arguments above to derive which measuring tools and evaluation methods can be used specifically in the networked-enhanced setting to determine learning on each of the cognitive levels.
References