Chapter 8
Methodology Applied Problem-Based Learning in Teaching HCI:
A Case Study in Usability Evaluation of an Online Course

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ABSTRACT

Problem-based Learning (PBL) is an instructional approach that uses a real problem to focus, motivate and facilitate learning relevant to the future performance of student conceptual, procedural and attitudinal knowledge as professional life. This paper presents and discusses the implementation of PBL teaching model in Human Computer Interaction (HCI), specifically in teaching usability evaluation of an online course. The model was applied to three classes of the HCI course, involving 16 students, a Brazilian University and 82 users. The methodology and results are presented in this work.

INTRODUCTION

The relevant changes in the society, provided by technological development and improvements in the educational process, are mainly reflected in the actions of teachers in the academic context. Educators are often looking for better ways to promote learning, either through changes in educational projects, either by adopting new teaching strategies (Kolmos, 2012).

Problem-Based Learning (PBL) is an instructional approach that has been experienced since the 60s, bringing significant results, impacting on the motivation of students and improving the quality of education (Savery, 2006), (Polyzois et al., 2010). In this approach, students work in small groups, researching and solving complex and practical problems of daily life (Loyens et al., 2011). A feature of these experiments is that the student becomes a more active role in the teaching and learning process, while it is the role of the teacher advisor of studies.

One possible way to use the process of teaching and learning based on PBL is through projects

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conceived as strategies for building knowledge. This method can motivate students and increase their productivity (Moylan, 2008). Therefore, it is necessary to create an action plan that allows performing the division of labor among students to enable achieving partial goals that will lead to the solution of the problem.

From real problems and based on an action plan that contributes to the understanding of the problem and its solution, PBL aims to join theory and practice (Savery, 2006). The application of PBL, through projects, can help develop work-related skills in staff, reflection and decision making.

There is debate about problems of the current model of professional training in teaching Engineering. The main complains are the indifference and apathy of the students in the classroom and the lack of initiative and inappropriate professional behavior of graduates (Case & Light, 2011). School curriculum of these courses is also organized sequentially, where theory always precedes practice. And the practice exists only when there are lab classes, workshops, group tasks, teamwork inside and outside the school environment, technical visits and project development. These activities tend to be naturally participatory and promote student involvement in the learning process. However, still dominates the pedagogical challenge of incorporating active practices in space and time currently occupied by traditional lectures. It is in the classroom and in the relationship between teacher and student that the changes are most needed.

There are many methods of teaching and learning that can contribute to a more effective learning. In a way, all forms of active and collaborative learning, student-centered, and constructivist teaching methods comply with this purpose. Among these method concepts, skills and attitudes in the curricular context and in the classrooms, we highlight the PBL, which is recognized for its ability to work simultaneously.

Research shows that PBL is a very effective teaching strategy, regardless of the subject, when compared with traditional teaching methods such as lecture. Students assimilate greater volume of content, retain information longer and enjoying their classes with more satisfaction and pleasure (Kolmos, 2012). Students who experience this method gain more confidence in their decisions and application of knowledge in practical situations, improve relationships with colleagues, learn to express themselves better orally and in writing, acquire pleasure to solve problems and experience situations that require taking decisions on their own, reinforcing the autonomy to think and act (Kolmos, 2012). PBL seems to be advantageous compared with expository instructional approaches; it is possible to contemplate the alternative of combining lectures with work problems. The motivation for developing this chapter was to understand the effects of this teaching methodology in Human-Computer Interaction (HCI) courses, specifically in the usability evaluation of interactive systems. The usability evaluation aims to assess the quality of the interface as a tool able to provide improved user-computer interaction. Different types of evaluation, with own goals and characteristics can be used (Nielsen, 1990; Nielsen, 1994; Nielsen 2012; Tselios, et al., 2008). In this chapter two usability studies are presented: User testing and heuristic evaluation through inspection. Both studies were conducted from the perspective of PBL methodology.

This chapter is organized as follow. This introductory section sought to trace the relevance and justification of the research, a second section is to review the literature on two topics of interest: usability evaluations and Problem-Based Learning. In addition, the chapter presents a discussion of the challenges in engineering education, explaining how PBL can motivate students of these courses and then presents a study on the related work involving PBL in teaching Architecture, Engineering and Computing, particularly in the disciplines of HCI. A third section presents a case study of the use of PBL in teaching HCI, the methodology adopted, the system used in usability evaluation

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