Innovative Approach to Teaching/Learning Strategies in Engineering Education

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Extended Abstract

A worldwide problem in engineering education is the way teaching/learning strategies are developed and implemented in engineering courses. This paper argues that the problem may be approached by using innovative teaching/learning strategies which are student centered. The arguments consider knowledge as a construction and reconstruction process based on phenomenological and hermeneutic concepts which are described in full. The approach fosters student/lecturer commitment and emphasizes continuous assessment of the process. Experiences mentioned in this paper have demonstrated the effectiveness of the proposed methodology.

In order to approach the topic of teaching/learning process this paper takes into account two important issues: on the one hand, the assessment of theories on how knowledge process takes place and, on the other hand, people's conception about knowledge itself. This debate takes place within the epistemological field given that the focus is on knowledge as a way of understanding the lecturers' pedagogical practices. First and foremost this paper recalls the traditional studies that discussed the act of knowing as a relation between the subject who knows and the object of knowledge. This relation has its roots in the debate between rationalism and empirism which, despite being overcome in the philosophical field, still lingers on as a background for pedagogical practices in many schools that keep considering knowledge as being situated in one of the poles either in the subject or in the object. These views having been surpassed by the conceptions based on phenomenology and hermeneutics which in turn, despite presenting different approaches one another, make possible a complementary understanding of the teaching/learning process. These conceptions consider that knowledge takes place as an interaction process involving the subject and the object. Last but not least, as regards the conceptions about knowledge, the issue is whether it is an insight or a construction. Phenomenology leads to an understanding that knowledge is a construction process or, if a hermeneutic approach is taken, knowledge is seen as a reconstruction process. This paper tries to shed light on those issues, finding on them a conceptual basis for underpinning pedagogical practices and alternative methodologies applied to the teaching/learning process.

The paper presents situations where the proposed approach can be applied and it considers aspects such as: recover knowledge history; assess knowledge in the current context and start from students' previous experience to mention but a few. It includes a practical and successful experience, which took into account such issues, - in actual engineering courses - based on the concept of knowledge as a construction/reconstruction process.

Keywords: *Engineering Education, Teaching/learning Strategies, Phenomenology, Hermeneutics.*