Collaboration of UG-PG Learners for Enhancement of Digital Design Verification Aptitude   Using PBL Methodology

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Abstract: The courses like system Verilog, VLSI Design Verification & Testing and Digital Signal Processing are considered for this activity. Delivery of these courses is centralized upon development of verification environment to identify and fix the bugs in DUT (Design Under Test). This is achieved by generating test vectors through programming. The proposed work binds three levels of leaners namely UG, PG and course owner by attaining proficiency in verification of digital design. The methodology is implemented in three major phases namely design of modules, preparation of verification plan and development of verification environment and coverage analysis. Project based learning (PBL) is used to implement the proposed methodology. PBL improved student's attainment by 15% as compared to previous year in VLSI Verification course. The average marks attained by both UG-PG is 79%.This also helped students to grab placement opportunities in VLSI verification domain. Also students experienced the industry culture of various teams working on single project.

Keywords: PBL, Verification plan, Attainment, VLSI verification, Collaboration, UG-PG , DSP

1. Introduction

In traditional teaching learning method there is one way communication from teacher to students but, student's teacher communication has become very rare except students show some interest. In traditional method delivery of knowledge to students does not guarantee that all will be received by students. The effective learning happens only when two way communication takes place

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between students and teacher. To enhance participation of students in learning and gain knowledge, many active learning techniques comes into existence. The PBL is one among various active learning techniques works on the mantra called "Learning by Doing".

Especially in academic, effective learning takes place when discussion happens at same age group or small age difference group as compared to the group of members where age difference is significant among teammates. The PBL provides a platform where same age or less age difference groups comes together to express their views on the topic.

(Intel tech 2012) Described concept of PBL inquiry in learning, benefits of PBL, Transformation of traditional classroom using PBL and various challenges faced by students and teachers in traditional teaching learning method and activity based teaching learning method. Also described challenges in implementation of PBL. (Shaban , 2018)Described PBL implementation and challenges faced by primary school pre service teachers. However, most of these aspects applicable to engineering graduates and teachers also. The challenges related to teachers, students, curriculum, schools, parents are described.(Barbara et al.,2017) In current education research profession these competencies are usually called as "21st century skills", "deeper learning," or "college and career readiness skills." The NRC committee clarified these concepts by defining "21st century learning competencies" as the "transferable knowledge" and "skills" that are produced through deeper learning processes. The aspects of learning for transfer, novices and experts has been detailed. Along with these research details, The PBL implementation describes the way how context contributes, investigate the effectiveness of implementation of various models for professional development of PBL, focus on the use of technology, deliverable, instructional strategies, study the link between