

# Students Perception of Capstone Projects

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## ABSTRACT

This paper describes an ongoing action research study based on application of the principles of the cognitive apprenticeship model applied to a final year capstone unit of study involving Information Systems analysis (ISA) projects. The aim of the capstone unit is to develop students' expertise in information systems analysis by exposing students to projects set in realistic environments, working with supervisors experienced in systems analysis. Students are formed into teams and work in the role of information systems analysts with industry clients on real world organizational problems typically related to process improvement in information technology.

The research for this paper is performed through the use of structured reflective journals where the students are required to answer a wide ranging set of questions. These questions are designed to encourage students to reflect on their understanding of both the project and the process of systems analysis. This paper reports on the journal submissions by students prior to starting the project in which students describe their understanding and expectations of the capstone project. The observations and views of two supervisors describe how initial interpretations of the role of supervisors by students can inhibit the interaction between students and supervisors.

## Keywords

Capstone Projects, Cognitive Apprenticeship, Information System

## 1. INTRODUCTION

Requirements analysis and design (RAD) for information systems development projects involves defining the problem, analysing and determining the requirements and proposing high level solutions. RAD in real world projects is described as a "wicked problem" because it is likely to be complex and often "characterized by incomplete, contradictory and changing requirements, and solutions that are often difficult to recognize as such because of complex interdependencies" [1].

It is unlikely that their previous academic experiences have prepared students very well for real world projects.

The methodologies taught in information systems courses are suitable to teach beginners but, in practice, experienced developers adapt and modify these methodologies or develop new ones as required by the project based on their expertise and experience. Several authors involved in education have noted that students "have difficulty handling ambiguity and vagueness, which can arise during knowledge elicitation". They also "have difficulty analysing problems where there is no single, simple, well-known, or correct solution" [2, 3].

Analysis and design subjects challenge students to think at a metacognitive level (e.g. thinking about thinking) but many students struggle to understand such abstract concepts [4-6]. Connolly and Begg also point out that students "often have considerable difficulty comprehending implementation-independent issues". Furthermore, when working on real world problems, their inexperience means they may not have developed mental models of relevant aspects of business and information systems which are appropriate or sophisticated enough to assist effectively in real world RAD projects [7-9].

Schon in [10] makes several points about design which is relevant to teaching. Firstly, he suggests that it cannot be taught by describing the process but instead must be learned through practice. Secondly, it is a holistic skill and the parts cannot be learned in isolation. Thirdly, it depends on having an understanding of which properties are desirable and undesirable in the context of the problem space and this can only be learned by doing. Design is a creative process and as such requires seeing and doing things in new ways [1].

Given the arguments above, a suitably supportive learning environment is required which recognises the particular challenges and difficulties faced by students learning RAD. One such approach is that of Cognitive Apprenticeship (CA) which uses the idea of synthesizing the more traditional apprenticeship model of instruction with the teaching of more conceptual subjects in the educational environment; hence the descriptor "cognitive" [11-13]. They provide a general framework to guide the development of teaching using the cognitive apprenticeship approach. The framework addresses four areas: content, methods, sequencing and sociology. The area of content is broken down to domain knowledge, heuristic strategies, control strategies (also called metacognitive strategies) and learning strategies. Methods relate the possible teaching strategies which can be employed for teaching and these include, for example, modeling, coaching, scaffolding, articulation, reflection and explanation. Key features of the cognitive apprenticeship approach are the provision of learning in realistic settings, the supervision of students by someone with practical experience and recognised competency and an interactive environment of mutual dialogue in which students and supervisors try to make explicit their understanding



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