A Framework for Analysing Effective IT Integration into Classrooms by Teachers

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Abstract
The objective of this paper is to explore the theoretical framework employed to identify, examine and describe how the socio-cultural factors support a teacher to effectively integrate Information Technology (IT) into a secondary school classroom environment. This paper discusses the advantages of using Activity Theory as a theoretical framework to analyse effective IT integration in secondary school classroom environment. The paper will use the data from one of the case studies to show how the activity system can be operationalised in practice.

Introduction
The objective of this research study is to find out what are the socio-cultural factors and how these factors espouse a teacher to effectively integrate Information Technology (IT) into a secondary school classroom environment. The main focus of this study is on the teachers. This is because “the teacher is central to everything that we do in education. Learning about new ideas and concepts is not achieved through textbooks alone, but when teachers engage their students by making ideas come alive.” (NIE, 2002p.11).

Background: Master Plan for Information Technology (IT) in Education
IT was first piloted by the Ministry of Education, Singapore (MOE) as a tool as sist students learning with the introduction of Accelerating the Use of IT in Primary schools (AITP) in 1995 in six primary schools, Student’s and Teacher’s Workbench (STW) in 1996 in six secondary schools and JCNet projects in 1997 in two junior colleges. The Master Plan for Information Technology in Education (MPITE), launched in 1997, is a follow-up based on the successes of the pilot projects and was implemented for 22 schools known as the demonstration schools in the first of a total of three phases. The goal of the MPITE is to integrate IT in education as a strategy to meet the challenges of the twenty-first century.

It is timely to conduct this study because Phase 3 schools have already been inducted into the IT integration process. The target of the Master Plan is to ensure that by 2002, all 368 schools in Singapore will be fully equipped with the necessary hardware and infrastructure which will support an IT integrated learning environment. In fact, by December 1999, the teacher-computer ratio for Phase 3 schools was 2:1 and the pupil-computer ratio was 6.6:1 for Phase 3 primary schools and 5:1 for Phase 3 secondary schools. The final target of the MPITE is to eventually equip schools with hardware such that the pupil-computer ratio will be 2:1 with 30% of IT-based curriculum time. Hence, it would be prudent to study some classroom environment to analyse how teachers are using IT as a tool to support their students’ learning.

Purpose of the study
A number of studies conducted in the past on teachers’ use of IT have used survey methods to determine factors, which affect teachers’ integration of IT. Some, like Sheingold (1990), Wang and Chan (1995), Braak (2001) and Wetzel (2001) have devised their own survey questionnaires to find out what factors influence teachers’ to integrate IT into their teaching. Others have used more established questionnaires to determine the factors that influence teachers. Some examples are the use of Concerns-Based Adoption Model (CBAM) and Diffusion of Innovations by M. Dooley, Metcalf and Martinez (1999) and Teaching with Technology Survey (TTS) and Computing Concerns Questionnaire by Chu (2000). These studies have successfully captured the factors, which influence teachers integration of IT into the classroom. However, what is lacking in these and most other studies are teachers use of exemplary use of computers for instruction and learning (Jaber & Moore, 1999). As Dias (1999) emphasises, there is a need to explore how teachers engage students in meaningful and beneficial learning and where computer is seen as part of everyday classroom activity.

Framework for the study
Hence, this research study proposes the use of Activity Theory as a framework to move beyond just reporting on the factors that influence teachers to integrate IT but how the interplay of these factors contribute to successful IT integration by the teachers into the classroom. Activity Theory is a framework that enables the study of different forms of human praxis as developmental processes, both individual and social levels interlinked at the same time (Kuutti, 1996). It is a framework that focuses on the interaction of human activity and consciousness within its relevant environment context. Hence, it enables the researcher to
analyse the context within which the activity is taking place and to report on the interactions.

As figure 1 depicts, the activity system consists of subject, object, tools, rules, community and division of labour. The subject of any activity is the person or group of people under study or the main focus of the study. In the case of this research, the teachers are the focus of this study and hence they are the subjects of the activity system.

The object of the activity system is the eventual product that the activity hopes to achieve. Therefore, in this case, the object would be effective IT integration by the teachers. The goal of the object therefore would be to support students’ learning. Tools would refer to anything that is used in the transformation of the learning as in this case IT tools as well as other tools used in collaboration with IT to support students’ learning. These form the main part of the activity system. Where necessary, the activity can be affected by rules such as classroom rules and lab rules. The community would be the other players in the system with whom the subject would have to interact. Division of labour deals with the different roles that each person adopts in order for the activity to take place. Therefore, based on the assumption of activity system, that is tools mediate the nature of human activity, the nature of a tool, in this case IT, can only be understood in the context of human activity. Consequently, the activity theory, according to Nardi (1996), provides a rich framework to study human activity and the tool that mediates or alters human activity in the context within which the tool is used.

By using the activity theory as a framework, this research study hopes to not only identify the socio-cultural factors that influence a teacher to integrate IT into the classroom but also to report on how these factors influence the teacher. The data from one of the case studies will be used to show how activity system can be operationalised. This would provide insight into the practices adopted by the teacher in using IT as a tool to support their students’ learning.

Figure 1: Activity System

Reference