Chapter 31
The Infusion of Technology Within the Classroom Facilitates Students' Autonomy in Their Learning

Fariel Mohan
University of Trinidad and Tobago, Trinidad and Tobago

Garry Soomarah
University of Trinidad and Tobago, Trinidad and Tobago

ABSTRACT

This experiment investigated whether the infusion of technology in teaching as a scaffolding tool can improve the pass rate of mathematics at the University of Trinidad and Tobago. The use of technology facilitated the building of a virtual classroom which was based on scaffolding, thus aiding students by either peers or the instructor until they are comfortable to move on to the next level. The virtual classroom was used to stimulate discussions on students' knowledge of mathematics ensuring no focus was on the technology nor the instructor. These discussions provide opportunities for the students to discover his/her existing level within the learning community. Within this learning community, everybody was anonymous including the instructor thus motivating the students to comment on the reflective questions. This encouraged students to collaborate and provide prompt feedback. Suggestions obtained from the students into improving the virtual classroom were considered resulting in four virtual classrooms.

INTRODUCTION

The use of technology in education is not something new or innovative but rather an asset in assisting our students with their cognitive skills. Many people have argued that the benefit of technology infused into education is non-existent or even limited to have any significant impact to truly advocate its use in the mainstream curriculum. To have an impact, some (Niess, 2005; Shulman, 1986) suggest that in order for technology to become an integral component or tool for learning, science and mathematics pre-

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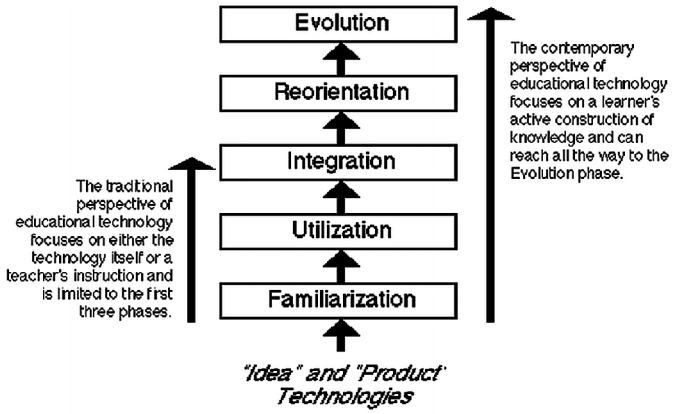
service teachers must develop an overarching conception of their subject matter with respect to technology and what it means to teach with technology. Others (Hooper,1991; Rieber & Welliver, 1989) state the full potential of any educational technology can only be realized when educators progress through five steps or phases: Familiarization, Utilization, Integration, Reorientation, and Evolution, otherwise, the technology will likely be misused or discarded. It is further stated that the traditional perspective of educational technology focuses on either the technology itself or a teacher's instruction which is only the first three phases as shown in Figure 1.

The motivation behind this experiment was to investigate if technology can be used to assist students to focus on constructing his/her own knowledge without developing an overarching conception of their subject matter. The success of this experiment was determined by an improvement in the pass rate in teaching. Research was done in order to determine which teaching subject will be the subject of this experiment. Researchers have noted that many students entering university often fail 1st year mathematics which may be due to a poor mathematics background (Eng, Li Li, & Julaihi, 2009; Rylands, & Coady, 2009; Whannell, & Allen, 2012). In the Caribbean, there is also a general weakness in students' mathematics background as stated by a former deputy principal of the University of the West Indies, Mona campus (Green-Evans, 2005). Students who complete high school write an official examination from Caribbean Secondary Education Certificate (CSEC) in order to get accepted into a university. Figure 2 shows a table summarising the results of all the Caribbean high school students who wrote CSEC mathematics for 3 years. This performance re-enforce the fact that students have a weakness in mathematics, especially in paper 2, the written examination. Paper 1 is multiple choice examination (Caribexams, 2004).

Based on these findings, the subject chosen for the experiment was 1st year Mathematics at the University of Trinidad & Tobago (UTT)). Technology was used to build a virtual classroom (VC) to assist students with their cognitive skills ensuring that the subject matter in teaching mathematics did not require an overarching conception. Instead the VC and physical classroom was part of a blended approach. The VC provided an environment for students to focus on expressing their existing knowledge of mathematics, reflecting on this knowledge and thinking in order to provide prompt feedback. At the end of the experiment, students provided suggestions to enhance the VC which were considered and other VCs were designed.

Figure 1. A model of adoption of both "idea" and "product" technologies in education



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