Abstract

The ubiquitousness of Internet and communication technologies is having a paramount influence on teaching and learning practices both in terms of what is learnt and how it is learnt. Mathematics teaching and learning is also facing new challenges due to enormous influence of new technologies on classroom practices and the subject content. This study makes an attempt to design and implement a web based learning environment to facilitate and enhance the teaching and learning of mathematics in a TAFE setting. The design and development of the web based learning environment aimed at promoting the use of new learning technologies in mathematics teaching and learning. The study included a practical orientation of action to bring about a change in the practice of teaching of mathematics in vocational education.

Using a design based research approach the study comprised two stages. In the first stage three mathematics teachers were involved in exploring internet based mathematics resources and participated in the design of a website that consisted of twelve units of basic mathematical topics with facilities for both synchronous and asynchronous communication. This web-based learning environment known as Maths Concurrent Assistance (MCA) Web-based was then trialled with a number of mathematics teachers and students in mainly workshop mode. In the second stage, the web-based learning environment was customised for a business mathematics module in a diploma course and trialled with a semester long course taught on campus in a blended learning format. Data obtained through classroom observation, WebCT logs, discussion board postings, test results and interviews were used to explore and analyse issues concerned with students’ participation, access and use and the role of teacher in facilitating mathematics learning. The study also included a quasi-experimental set up to compare achievement and attitude of students who participated in this experiment with another group of students taught the same content by the same teacher in a traditional mode.

Results from the study indicate that students’ successful participation in web-based mathematics learning in vocational education is contingent upon factors including learner readiness, interface design and course design. Students’ attitude towards mathematics appeared to influence their participation in web-based mathematical activities. Although
computer skills and confidence is necessary for successful participation in web-based activities, students’ attitude towards mathematics played a more important role in determining their participation.

The study also found that course design factors play an important role in affecting teacher’s and students’ attitude and motivation in making use of web-based learning resources in a mathematics classroom. Rigid demands imposed by learning outcomes and assessment procedures appear to constrain students’ learning and exploration with web-based activities. Comparison of attitude indicates that experiment group students developed significantly more positive attitude towards mathematics than control group students. Although achievement scores of experimental group did not vary significantly compared to control group, learning gains made by the experimental group were found to be qualitatively different.

The research has highlighted issues related to design and use of web-based mathematics learning in the vocational context and shown that web-based learning activities in mathematics are able to offer mathematics teachers more exploratory, authentic and problem based learning opportunities in the classroom. However, educators need to recognise the challenge of bringing web-based learning to mathematics classrooms with the view that assessment is an integral part of teaching practice and it must reflect new dimensions of learning afforded by web-based learning activities.