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Use of Information Technology as Tool in in Education Sector

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INTRODUCTION

There seems to have been a change in the culture of students over the last few years, with regard to learning and teaching. Traditional methods of teaching seem to be a bit outdated and modern techniques of content delivery are becoming quite important. Multimedia provides educators with the tools to bring learning alive for students [1]. An optimum mix may be a blend of traditional techniques and modern approaches that use computer hardware and software tools. The importance of the use of technology for teaching has also been discussed in [2], [3] and [1].

The use of software and hardware IT tools can be beneficial, for instance in the teaching of networking. I would use my networking class as a case study. In previous classes an overhead projector would be used for the presentation of slides and discussion of the relevant topics e.g. ISO/OSI network architecture model, DNS lookup and POP3 protocol. For several years students had problems actually visualizing that a message starts at the application layer and is broken down and changed/formatted as it moves down to the other layers. Initially a picture of the layers was used and the instructor explained how, say, an email could be sent from one computer to another. Many students had difficulty understanding it. However, when an animation was used where an email message was broken down into parts and headers/footers added as it when down the other layers – most students were able to understand. Apparently, students tend to like a multimedia approach to content delivery.

As technology advances, students have come to expect more of their professors in terms of delivery of material. It is my view that students from the era when multimedia projectors, presentation software etc. were unavailable were satisfied with what was available then. Modern students are generally aware that new technologies exist and may be reluctant to accept older teaching techniques. The ideas suggested are meant to improve the delivery of material to students by professors in relevant disciplines.

The traditional method of lecture delivery e.g. a professor speaking for an entire lecture session and making brief notes, may now be a bit outdated for the delivery of some subject areas, as it makes the student have to both write and listen at the same time. Heavy memory retention is also needed (greater reliance on short-term memory).

Slides e.g. those created in Microsoft PowerPoint may be more appealing to the eye and can contain audio and video. The simple notion that technology is being used for a presentation can make students more attentive. Multimedia slides also allow for the professor to advance key note by key note, with the student having access to only parts of the projected information at a time. Traditional overhead projectors generally allow one to see all the information on a slide at the same time, whereas presentation software allows the professor to restrict what is being shown. Making a lot of information available to the student may make him not focus on the point that the professor is discussing at a given interval of time.

It is also easier for the professor to move among slides. Frequently, students may ask questions that refer to slides that appear later in a presentation. The presentation software allows one to scroll through to other target slides effortlessly and in a timely manner. It is generally faster than scrolling through traditional manually projected slides.

Software Tools to Assist in the Teaching of Programming: I think there are many advantages to be gained from teaching programming using a laptop connected to a multimedia projector, especially for the earlier classes in the term. With wireless technologies available, it may be possible to demonstrate how to access network files etc right from the classroom. (There could also be wired connections built into the classrooms as well).

The students can therefore actually see the steps/commands to compile/run programs etc. Input values can be varied according to student and professor preferences and the corresponding results displayed immediately. Instead of having students visualize in their

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minds what should happen when different inputs are used, they actually, in real-time see the effects. Quite important too is the fact that students may want to see the effects of variations in the programming codes used in a solution. We are not saying though that the traditional methods of teaching programming are useless. The two approaches can go hand in hand.

The relevant changes can be quickly made by the professor and the students can see the associated outputs. In fact, code that students thought would work quite well can be demonstrated to fail and the professor can ask for corrective suggestions, which can then be re-coded as necessary. Of course the professor must be quite proficient in his field of study, as students' queries and suggestions may sometimes be quite complicated. In summary, by looking at this 'cause' and 'effect' approach, the learning process may be more interesting for the student. However, the professor's success in meeting the variations that the students require can in turn build their confidence further!

SIMULATIONS

The use of simulations would have some benefits to that derived from programming. Parameters can be input and results seen in real-time. There might be the need for a network infrastructure as previously mentioned e.g. wired or wireless network access. Simulations are useful for instance, in the teaching of router programming. Students can see how subnets are designed, subnet masks specified, filters are designed, configurations are enabled or displayed etc.

Notes on Electronic pictures used for Multimedia Slides: Pictures used in slides should be meaningful and preferably indicate the context in which it occurs, especially in the case of pictures of computer equipment. A simple example is to show a picture of an Intel processor in its place on a motherboard, rather than in isolation. Although the focus may be on the processor itself, the student gets to see the context or location in the computer where it fits in. An actual picture e.g. one taken of a processor in a computer with a digital camera is preferred to a drawing. Therefore Fig. 2 below would be preferred to Fig. 1. Drawings tend to leave some extent of ambiguity of a concept, as the student has to map the drawing to an actual image in reality. Extra information may also be gained from the actual picture. E.g. the codes used as a stamp on a processor may be displayed and lead to further discussion.

Further Notes on Slides: Slides are easy to edit, add speaker notes to and made available to students who can edit as necessary. From the students' view, the slides for an entire course are frequently small enough to fit on CD or memory stick (portability).

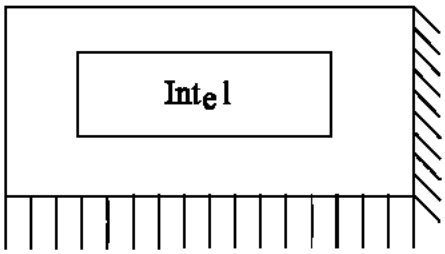

Fig. 1

Fig. 2

Software Tools for Children: Software tools like children educational software can help kids learn at their own pace. Audio and video tend to make children interested in computer activities. For more information on the usefulness of children's software, see [3].

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