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New knowledge through new skills

By Sultana Ali Norozi



“Children cannot be effective in tomorrow’s world if they are trained in yesterday’s skills.” (Tylor 2004). To cope with the challenges of a rapidly changing world, we have to acquaint our students with new knowledge and skills. And for this the role of information communication technology (ICT) is paramount in today’s world.

ICT is viewed as computer, multimedia and internet along with all the audiovisual materials and equipment. Ictadvice organisation defines ICT as: “Information and communication technologies are the computing and communicating facilities and features that variously support teaching, learning and a range

of activities in education”.

It is important to understand the nature of science and think what is distinctive about it. Then go on and ask what ICT can and can not do for science education.

School science is a very practical subject. It involves doing things through observation, measuring, communicating, discussing, trying things out, investigating, handling things, monitoring, and recording the results, etc. These are all things we see happening in science classrooms and ICT can help in virtually all of these activities. On the other hand, science is an equally theoretical subject. It involves thinking, inferring, good ideas and hunches, hypothesising, theorising, simulating and modelling. Experiments are as important as hands-on-activity as far as the subject of science is concerned. ICT can help as much in this as it can in the practical aspect.

There is also a need to see science from two different angles when we talk about teaching it and learning it. The two viewpoints involve process and content, both are equally important to science education. The content of science is its facts, laws, theories and understanding and ICT

can help in learning the content of science. For example, information sources such as the internet and materials on CD-ROM can play a part in learning as can traditional books.

There are a number of uses of ICT in the teaching and learning of science. ICT can be used to produce charts, tables and graphs in order to handle the data from scientific investigations. Additionally graphics are used in pictorial records. Apart from this, investigations and report findings can easily be made available to specific audiences. Email comes handy here. Internet serves to research the scientific information which can be handled with the use of different databases. Multimedia can also be used to respond to the given information. Word processing is best for recording information for specific purposes, for example, publication in the school newspaper, etc. Simulations are a paramount alternate for dangerous and difficult science practicals which may not be possible otherwise. Meanwhile virtual field trips make it possible to visit different and faraway places such as museums, botanic gardens, etc.

And why just science? ICT can also be used in other teaching of other subjects. ICT's advantages are kept in two demeanors: advantages for teachers and advantages for pupils. However, we as teachers and teacher educators should not use ICT principally so that we can marvel at the brilliance of computers; we should use it to help us develop a better understanding of our subjects.

Computers do exactly what they are instructed to do, very quickly and as many times as they are commanded to do it. On the other hand, it means that they are not capable of making autonomous or independent judgment or personal interpretations. However, it is also the case that they do not become tired, bored, hungry, irritable, angry or impatient or liable to error. This may place them at an advantage as compared to human beings. It has been said that one of the reasons why children appear to enjoy learning with computers is precisely because of these impersonal and inhuman 'qualities'. ICT has most certainly changed the teacher's role in the classroom.

The following points need to be considered in the planning and teaching of subjects through ICT:

- Keep pupils sharply focused on the task at hand through a clear description of what is required and by support throughout the lesson.
- Always remember that as a teacher your job is to teach your subject and not ICT.
- Ensure that the task set is within the pupils' ICT capabilities.
- Have a backup plan to deal with situations where computers have not been working or the internet is down.
- Identify the learning aims and objectives for the pupils which can be enhanced by using ICT.
- Plan the timing of the activity to include non-ICT tasks such as questioning, group work and pupils' discussions.

- Decide when it is appropriate to use ICT in the classroom.
- Timetable the use of the computer or internet.
- Ensure that children interact with the computer. The teacher can do this by asking open-ended questions.

Despite the intrinsic attractions of ICT and its high profile in contemporary education, its use in classrooms should be driven by the needs of the learners and the purposes of teaching. It must enable the children to learn more effectively than they would if ICT were not used. The teacher's role as a facilitator is always there to support and provide a scaffold for pupils but ICT can not be the substitute for a teacher.

Concurrently there are some obvious issues and challenges regarding the use of ICT in classrooms. There are three strands to this exploration: issues related to management, issues concerning pupils and issues in regard to the teachers. For example, the key question for a school is how best can ICT be developed and managed in a school setting?

Unfortunately, in schools as with any other organisation, there are a lot of vested interests, power struggles and micro politics going on behind the scenes. Teachers are not really the ones with the power or status to make decisions for the entire school. It is also convincing that the use of ICT is not always compatible or easy to reconcile with in the school classroom. It requires more space than a science laboratory, like a separate computer room or lab.

Secondly, one of the paradoxes with which we have been grappling in our schools is training of teachers to handle technology. Most teachers are not well-trained in the use of ICT at a professional level. There are hardly any professional development programmes or support offered to the teachers from school managements.

Thirdly, technology itself is sometimes not reliable. There is also a severe drop in motivation when the computer system fails or when machines available in the school are significantly less powerful than those in the pupils' homes.

Besides the managerial challenges, the pupils too have their own share of problems. For instance, the internet is now regarded as a key to providing considerable information. Internet provides such a wealth of information that the problem has changed from "how to get information?" to "how to cope with all the available information". From this emerges another problem — the pupil's ability to handle and interpret data. The pupils may also fall into the trap of spending more time learning about software rather than learning their subject. Uncensored information on the internet is not always authentic leading to many misunderstandings.

Some teachers too consider teaching through ICT an additional burden on their already busy schedule. Then there are those who don't feel confident about it at all. Others may still not be convinced of its benefits. There are also many teachers out there who perceive that their students know more ICT than them.

The use of ICT in the classroom may spawn a number of pedagogical questions and challenges. For example, how do we generate and evaluate ideas? Interpret arguments? Handle controversy? Present various view points? Decide on a course of action? Other challenges include lack of time, need for appropriate assessment strategies and integrating values and ethics into the subject. But despite all these things, we cannot lose sight of ICT as a capital part of the learning system.