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Teaching with technology integrating information and communication technology (ICT) into curriculum

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Abstract
This paper discusses the need to incorporate ICT into school curriculum to maximize educational outcomes. It highlights technology integration, Challenges faced in implementing ICT and possible solutions.

Keywords: ICT, curriculum, maximize educational

1. Introduction
The 21st century dawned as the beginning of the digital age - a time of unprecedented growth in technology and its subsequent information explosion. Never before have the tools for information access and management made such an impact on the way we live, work, shop, play and most important the way we teach. It has become necessary to identify educational program that integrates new instructional strategies and a mixture of technology tools which focus on high academics and the integration of 21st century skills. Educators at all levels, who are preparing students for the information age, must not only be accomplished in the use of ICT but also in the integration of ICT into the curriculum. They need to use their subject expertise to select appropriate ICT resources and infuse ICT in ways that will challenge pupils understanding and promote greater thinking and reflection.

2. Need to incorporate ICT
The infusion of ICT into teaching and learning has had a remarkable influence on the instructional strategies of the institutions. In contrast to traditional methods, in the modern leaning environment, being tech savy, students play an active role in their learning process and determine how to reach their desired learning outcomes on their own. Integration of ICT across the curriculum helps learners develop ICT capability and provide them with knowledge and skills applicable across the curriculum. Here are some of the reasons to integrate technology in teaching:

2.1 Better delivery of instructions
With the help of technology, teachers can make interactive lessons which not only engage students in the classroom but also keep their interest alive. Things like videos, pictures, slideshows and animated clippings (gifs) capture students' attention and make learning fun. With countless online resources teachers have access to an infinite wealth of information and digital media to enhance students' understanding of topics.

2.2 Better and quick assessment methods
With the help of technology, teachers can measure the progress of students in real time. Teachers can easily make online quizzes using variety of tools like Google forms, Microsoft forms, Hot Potatoes, Kahoot, etc., to assess the students online. This enhances the ability of teachers to further their understanding of students' learning and what areas need a bit more focus and instruction.

2.3 Personalized learning
Personalized learning helps to address the distinct needs and interests of the individual students. A student who needs extra help on a particular topic need not hold up the entire class, or feel embarrassed asking for that help. He can learn at his own pace with the help of student-specific e-modules, e-assessments, e-class rooms and mobile apps available. Technology allows teachers to easily work oneon-one with students without losing sight of the needs of the classroom as a whole. Emergence of Massive Open Online Courses (MOOCs) and Online Courses has extended class room learning. They are open to anyone anywhere without entry qualifications and for free. Students can take up these courses to enhance their skills.

2.4 Easier communication with parents and students
Technology has transformed the way teachers communicate with parents and students and even how students communicate with peers. With the mobility of email, text messaging on smart phones and numerous free mobile apps teachers can remind students and parents about homework, progress reports, and upcoming assignments in a matter of seconds. Parents can now stay more informed about their children's progress in school and what they are learning.

2.5 Anytime anywhere learning
Not only does technology extend the learning outside the walls of the classroom it also makes it mobile giving students the benefits of learning anytime anywhere. Advent of e-

learning and m-learning has given new dimensions to education system. Now, students sitting in the remote area also get chance to study. Learning is being delivered to their hand-held devices where they can consume it on the go.

2.6 Self-expression

Using modern technology, students can express them by making a Power Point Presentation, recording/editing spoken word, doing digital photography, making a video, running a class newspaper, composing digital music on a synthesizer, making a website, creating a blog, etc. They can easily express their talents in an online world and the reach is unlimited. Online discussion forums are a source of learning and discussion. Students can join online discussion forums to learn and gather information from people across the globe. They can also contribute their ideas and get inputs from others.

2.7 Inclusive learning

In today's education system, the goal for students with special needs is to allow them to be in the least restrictive environment. Instead of segregating them in separate classrooms, teachers are now finding ways to allow students with special needs to showcase their knowledge and talents, and technology is making this possible. Teachers can make use of visual aids, use programs that read out loud to students who need it, or simply incorporate more interactive activities as opposed to simple reading and writing.

- Besides, this many software/ apps are coming up to help Children with Special Needs (CWSN) overcome their difficulties with comprehension, problem solving, organizing, and communication skills. Daisy books and 3D printed Braille material are available for students with visual impairment. Peripherals, like Intellikeys Keyboards and Ablenet Switches, have been designed to provide easier access and use of the computer for those with special needs.
- Making students' future ready: Preparation of today's students to be college and career ready seems like a daunting challenge. Experts have identified a long list of indicators -- from content mastery to lifelong learning skills -- that are considered critical for students' future success. It is important to instill technological skills in students and promote skills like robotics, 3D printing, and virtual reality to prepare students for the future.

2.8 Students as global citizens

For the progress and development of a fairer and protected world we need to understand the importance of preparing students for the global world. Technology plays an important part in making our students global citizens. With the help of tools like Skype, students in one corner of the world can interact with students in some other corner. They can go for virtual field trips, call experts from other parts of the world in their own class room and understand the culture and problems of students of other countries through direct dialog and collaboration. Giving students an understanding of globalization will create effective future leaders because they will be capable of seeing things from a world view. Regular exposure of latest technologies and access to internet has also led to increase in the cyber threats and vulnerabilities. These threats pose serious risks to children since most of them are ill-informed regarding this issue. It is very important to apprise students of the 3C's: Cyber Safety, Cyber Security and Cyber Ethics. By educating kids, we are ensuring that the future generations will be safer online. The development of technology literacy is key to creating a programme to prepare learners for the demands of the future and to support social development and improve economic productivity.

3. What is technology integration?

Before we can discuss how to shift our pedagogy or the role of the teacher in a classroom that is integrating technology, it is important to first define what "technology integration" actually means. Technology integration is the incorporation of technology resources and technology-based practices into the daily routines, work, and management of schools. It is important that integration be routine, seamless, and both efficient and effective in supporting curricular goals and purposes. Developing a culture that embraces technology is also important to its successful integration. Integrating technology doesn't only mean using it as a tool. Teachers must understand how to integrate it into teaching so that students can build their 21st century skills. Technology should not be integrated just to enhance teaching learning process but to take it to new dimensions.

4. Challenges faced

The integration of information and communication technology (ICT) in teaching and learning provides more opportunities for teachers and students to work better in an information age. However, some barriers may discourage teachers to integrate ICT in the classroom and prevent them to introduce supporting materials through ICT usage. The problems are much more magnified in case of schools located in remote villages and rural areas. Examining the barriers for using ICT in education can assist the educators to overcome the obstacles and integrate the ICT in everyday education. Some of the barriers to ICT implementation include:

4.1 Lack of ICT skills in teachers

A major obstacle in the use of ICT is the lack of technological knowledge and skills in teachers. Teachers do not have enough knowledge of latest ICT tools and technologies and are therefore not willing to use them. Even after receiving ICT training, when it comes to practically applying ICT, many may not know how to deal with it and sometimes they are reluctant to accept new technologies in their classrooms.

4.2 Teachers' attitude and beliefs

The successful implementation of the educational technologies depends largely on the attitudes of the educators. They argue that with ICTs the syllabus will never be completed and therefore their learners will be disadvantaged. They are unaware and rigid and not willing to adapt to the change. In these circumstances, a lack of motivation to learn new skills may occur, which is often compounded by feeling threatened by newer forms of ICT that students will understand better than teachers do.

4.3 Shortage of time
Apart from teaching, teachers are usually burdened with multiple tasks. The average teacher doesn't have the time or energy to figure out new tools and systems on his or her own. They do not find time to design, develop and incorporate technology into teaching and learning. Learning new ICT skills is a time consuming and an ongoing process.

4.4 Unfavorable organizational culture
Often in developing nations, the educational organizations and school management fail to perceive the importance and seriousness of the role of ICT in education enhancement. Schools do not feel a need to change; they are content with their familiar tried and tested ways of teaching. There is a resistance to change and this resistance is based on an unclear understanding of what change should constitute and the reasons why changes should take place in the first place.

4.5 Insufficient funds
To use the technology effectively and efficiently, availability of latest hardware and software facility is essential. In developing countries, technology implementation into education systems is a difficult task as it requires a magnum of funds, infrastructure and support facilities. Also, investing in ICT for schooling is usually regarded as a long-term issue. Lack of finances leads to outdated and obsolete infrastructure and shortage of equipment thereby rendering the entire ICT experience meaningless. Another major concern is that computer hardware is becoming obsolete very fast and it is difficult to update it regularly due to lack of funds.

4.6 Lack of technical support
One of the major obstacles to optimizing computer use in schools has been the lack of timely technical support. Teachers often have to struggle to get a projector or program to work, or sometimes they lose a week's work on a project because of a glitch in a system. Without on-site technical support, much time and money may be lost due to technical breakdowns.

4.7 Internet issues
Access to the internet is highly limited in remote areas, and relatively poor infrastructure in developing nations such as supply of electricity makes this worse. Most schools cannot afford the high fees charged by internet providers and even where there is internet, slow or erratic connectivity destroys the very essence and impact of ICT. Internet issues coupled with the poor quality of service providers poses a major problem in implementing ICT.

4.8 Lack of proper training
Teachers are not trained properly. Usually training programs are based on teaching new upcoming ICT tools and do not include integration of ICT tools into teaching pedagogies. Also, the number of training programs is not sufficient.

5. Possible solutions
The scenario of the future demands that teachers act as learning facilitators to students. Learners must be encouraged to construct, evaluate, manipulate, and present their ideas while demonstrating understanding of curriculum concepts. ICT can surely help teachers to be the agent of change. It needs to be understood that ICT is a precursor in helping teacher to teach better, not a compulsion or burden on a teacher for using it. To remove hindrances in the way of implementing ICT in education the following steps are worth consideration:

6. Change in school policies
6.1 Infrastructure
Schools should recognize the pervasive nature of ICT and grow to accommodate the changes. More budget should be allocated for ICT. The pre-service and in-service teacher training about ICT should be increased in quantity and quality. ICT training and equipment costs are high (primarily for initial outlay, maintenance and replacement). Therefore, the investments made must be strategic after careful analysis and planning, finding creative ways of financing, and creating synergies. Instead of buying expensive software, open source software and free tools and apps might be a good choice. Schools should prepare technology plans to integrate ICT into curriculum. Teachers who integrate ICT into curriculum should be supported.

6.2 Teacher training
It is critical to provide teachers with in-service technology-related training at multiple levels. They must go beyond how to operate a new device, to cover how to integrate technology into the curriculum and how to teach in a technology-enabled environment.

6.3 Teacher support
New approaches should be designed to consider the obstacles that teachers face. For many teachers, lack of time is the greatest constraint. Technologies that save time and make the teacher's job easier are more likely to be adopted than those that add complexity. Even when a new approach seems promising, it must be designed with its overall impact on the teacher in mind. Teachers should be given classroom assistance by trainers, working alongside teachers to observe, support, evaluate and model computer integration.

6.4 Motivating teachers
Even if teachers are provided with up-to date technology and supportive networks, they may not be enthusiastic enough to use it in the classroom. Teachers need to be given the evidence that ICT can make their lessons more interesting, easier, more fun for them and their pupils, more enjoyable and more motivating.

7. Change in attitude of teachers
7.1 Adopting new pedagogies
Teachers should have technology in their mind when they are planning everyday lessons or longer learning experiences. Teachers must identify what tools will make content more accessible for students with different learning needs and how students can create products with tech tools that will help them build digital skills. They must adopt a positive mind set and be ready to accept new ICT systems, technology and software as educational tools. Teachers should take on the

responsibility to remain up to date with developments in educational technology and should not be afraid of trying something new. Teachers should join educational forums and online communities that aid them in supporting one another and exchanging ideas. Plethora of web 2.0 tools are available which can help to shift from being a medium, where information is transmitted and consumed, into being a platform, where content is created, shared, remixed and repurposed. Blogs, wikis, podcasting, social bookmarking, and social networking sites are some examples of Web 2.0 applications. Since it's clear that tech integration is here to stay, it is not a question of whether teachers integrate technology into their classrooms, but rather how to do it best. By taking small steps, teachers can begin to reap the benefits that technology can bring to their teaching and to student learning. This process does not have to be painful, and no one will become a tech integration whiz overnight. However, even with limited access, with careful planning, some risk taking, and an open mind, teachers can successfully use technology to enhance their teaching and bring learning to life for their students.

8. Conclusion

In today's world, it is unthinkable to sever technology from classroom teaching. Although technology is not the magic wand to fix all problems, but it does allow for more flexibility of the learning process, more engaged classroom and improved student learning. It is undeniable that teachers who are integrating ICT into curriculum have a fascinating future ahead as ICT takes them forward into 21st century. They are switching from the all knowing guru to the role of collaborator and facilitator and whose responsibility is to provide the parameters, feedback and reflections their students need to be successful.

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