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Effective Teaching and Learning of Physical Education through ICT

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Abstract: Information and communication technologies (ICTs)—which include radio and television, as well as newer digital technologies such as computers and the Internet—have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life.However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic. The effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology—indeed, given enough initial capital, getting the technology is the easiest part!—but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing, among others.

Key Words: *Information, Communication, Technology and Educational Quality.*

Introduction:

Learning to learn, ‖ i.e., the acquisition of knowledge and skills that make possible continuous learning over the lifetime. ―The illiterate of the 21st century,‖ according to futurist Alvin Toffler, will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.‖ The International Labour Organization defines the requirements for education and training in the new global economy simply as ―Basic Education for All‖, ―Core Work Skills for All‖ and ―Lifelong Learning for All‖. The term, information and communication technologies (ICT) refers to forms of technologies that are used to create,

store, share or transmit, exchange information. This broad definition of ICT includes such technologies as: radio, television, video, DVD, telephone (both fixed line and mobile phones), satellite systems, computer and network hardware and software; as well as the equipment and services associated with these technologies, such as videoconferencing and electronic mail. (UNESCO 2002).

This primer is intended to help policymakers in developing countries define a framework for the appropriate and effective use of ICTs in their educational systems by first providing a brief overview of the potential benefits of ICT use in education and the ways by which different ICTs have been used in education thus far. Second, it addresses the four broad issues in the use of ICTs in education—effectiveness, cost, equity, and sustainability. The primer concludes with a discussion of five key challenges that policymakers in developing countries must reckon with when making decisions about the integration of ICTs in education, namely, educational policy and planning, infrastructure, capacity building, language and content, and financing.

ICTs help expand access to education

ICTs are a potentially powerful tool for extending educational opportunities, both formal and non-formal, to previously underserved constituencies—scattered and rural populations, groups traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, persons with disabilities, and the elderly, as well as all others who for reasons of cost or because of time constraints are unable to enroll on campus.

Anytime, anywhere. One defining feature of ICTs is their ability to transcend time and space. ICTs make possible asynchronous learning, or learning characterized by a time lag between the delivery of instruction and its reception by learners. Online course materials, for example, may be accessed 24 hours a day, 7 days a week. ICT-based educational delivery (e.g., educational programming broadcast over radio or television) also dispenses with the need for all learners and the instructor to be in one physical location. Additionally, certain types of ICTs, such as teleconferencing technologies, enable instruction to be received simultaneously by multiple, geographically dispersed learners (i.e., synchronous learning).

Access to remote learning resources. Teachers and learners no longer have to rely solely on printed books and other materials in physical media housed in libraries (and available in limited quantities) for their educational needs. With the Internet and the World Wide Web, a wealth of learning materials in almost every subject and in a variety of media can

now be accessed from anywhere at any time of the day and by an unlimited number of people. This is particularly significant for many schools in developing countries, and even some in developed countries, that have limited and outdated library resources. ICTs also facilitate access to resource persons—mentors, experts, researchers, professionals, business leaders, and peers—all over the world.

The ICT brings more rich material in the classrooms and libraries for the teachers and students. It has provided opportunity for the learner to use maximum senses to get the information. It has broken the monotony and provided variety in the teaching – learning situation.

The ICT being latest, it can be used both at school and higher education levels in the following areas:

- Teaching
- Diagnostic Testing
- Remedial Teaching
- Evaluation
- Psychological Testing
- Development of Virtual Laboratory
- Online Tutoring
- Development of Reasoning & Thinking
- Instructional Material Development

ICT to improve student learning

ICT should be utilized selectively within the learning context and should focus upon improving students‘ understanding and enthusiasm. The prime goal must reside with effective teaching and learning with ICT contributing to such a dynamic process. It is important to remember that ICT is not a tool for learning but a medium for delivering pre-determined content. Lessons must be avoided where students simply search for and retrieve information with no prior learning outcomes being set by the teacher.

ICT allows the teacher to reconsider teaching and learning and frees the teaching from the constraints of the classroom and traditional teaching strategies. ICT is appealing to students and must surely be the preferred learning mode, given that the computer is often viewed as the _child‘s machine‘. If learning materials are designed around technologies, the student should be motivated by such opportunities.

The integration of ICT should promote and enhance learning by:

- Accessibility – bringing the world to the classroom.
- Involvement with technologies distinct from conventional methods.
- Accommodating the various paces of learning.
- Encouraging students to access and evaluate information from various sources.

ICT offers a range of tools so that pupils can analyse, evaluate, and compare performance. **This includes:**

- Using performance analysis software and hardware.
- Using ICT to record and analyse performance.
- Using ICT to track participation, involvement, and improvement in physical activity.
- Accessing, selecting, and interpreting information.
- Recognising patterns, relationships, and behaviours.
- Modelling, predicting, and hypothesising.
- Testing reliability and accuracy.
- Reviewing and modifying work to improve quality.
- Communicating with others and presenting information effectively.
- Evaluating their work.
- Improving efficiency.
- Being creative and taking risks.
- Gaining confidence and independence.

Technologies in Physical Education

ICT incorporates a vast array of hardware and software. The following technologies should be considered for use within PE for planning, administrative and teaching purposes:

- **Internet** – A global network that provides the capability to communicate, share ideas, and access information and resources from around the world.
- **Intranet** – Similar to the Internet, but limited to information and communication within a school or organisation.
- **CD-ROM** – Information presented in the form of graphics, text, sound, and moving video.
- **Wristwatch / Heart Rate Monitors** – Usually consist of a strap fitted around the chest that transmits heartbeat signals to a wristwatch monitor through radio signals.
- **Digital Camera** – Stores pictures in computer memory instead of film. Images can be displayed directly on a computer monitor or imported into graphics software for editing.

- **Generic Software** – Common software applications such as word processors and spreadsheets.
- **Video Capture** – A video camera connected to a computer that allows video sequences or still images to be stored, edited, and analysed digitally.
- **Data Handling** – Information can be stored, organised, and managed in a database.
- **Desktop Publishing** – Combines text, graphics, and layout tools to produce professional-quality documents.
- **Presentation Software** – Software such as Microsoft® PowerPoint used for presenting information in slide format.

Role of Ict

Information and communication technology has a role in the learning and teaching process as a teaching tool. The use of ICT by learners offers enormous potential to enhance learning in all subjects, as well as for physical education & sports. Developing an ICT culture is an important part of the process of integrating ICT into a school's learning and teaching programs. ICT involves both teachers and students in the learning and facilitation process.

- Teachers: ICT serves as an aid in the teaching process through evaluation, administrative support, information resources, and special education.
- Students: ICT helps students acquire information independently and promotes communication and interaction among students as well as with the outside world. It encourages self-directed learning, develops students' IT and ICT skills, motivates them towards greater learning, and promotes independent thinking.

Key concepts that can be applied and developed in PE

- Using data and information sources
- Models and modelling
- Control and monitoring
- Refining and presenting information
- Practical use of internet as a tool in the learning process of physical education

The use of technology in the learning process of physical education may not be a goal of it's own, but it is a tool with which to reach objectives.

A) Integration of ICT into Learning and Teaching Physical Education

1. **Administration:** ICT is used to prepare documents, lesson plans, and to calculate or convert scores using software such as MS Excel and MS Word.

2. **Management:** ICT helps in classroom management, including discipline, class organisation, and time management.
3. **Feedback:** Tools such as video recording, personal computers, and heart rate monitors provide effective feedback to students.
4. **Remedy:** Educational software and heart rate monitors help in corrective teaching and improvement of performance.
5. **Evaluation:** Video analysis and digital camcorders are used to evaluate and analyse students' performance in action.
6. **Professional Development:** ICT supports lifelong learning, continuing education, and sharing of professional experiences among teachers.
7. **Public Relations:** Communication through the Internet helps connect with the outside world. The Internet acts as a Computer-Mediated Communication (CMC) system.

For the purpose of this article, Computer-Mediated Communication (CMC) may be defined as the process of interaction through the direct use of computers and communication networks. It promotes "two-way communication" and "critical conversation" in the active learning process.

B) Effectiveness and Efficiency in the Learning Process of Physical Education through ICT

1. E-mail

a) Educational Applications for Students

Students have the opportunity to email their questions or comments regarding health, nutrition, fitness, physical education programmes, courses, etc., to physical education teachers or academic staff.

E-mail also helps students communicate with the outside world, such as finding international pen pals to exchange ideas about sports and physical education.

b) Applications for Physical Education Teachers / Faculty Members

- Curriculum development in Physical Education.
- Establishing contact with experts and organisations.
- Involving parents and students in school physical education activities.
- Cooperating with colleagues worldwide.
- Assisting students in their learning process.

2. Mailing List Archives

Older articles and educational materials can be accessed through mailing list archives.

3. Newsgroups

Newsgroups related to Physical Education and sports provide opportunities for discussion and sharing information.

4. Chat

Interactive chats improve communication with students, customers, and community members. Chat facilities allow groups of people to communicate publicly or privately through websites, intranets, and extranets. Team members from different locations can conduct online meetings with managers, suppliers, and buyers. Students, instructors, and teachers can also participate in academic chat groups.

5. Videoconferencing

Videoconferencing technology enables people at different locations to see and hear each other simultaneously.

This technology provides opportunities for:

- Formal instruction, lessons, and tutoring.
- Interaction with guest speakers and experts.
- Multi-school project collaboration.
- Professional meetings and interviews.
- Community events and educational discussions.

6. Recording and Analysis of Performance Data

ICT tools help in recording and analysing students' performance data effectively.

7. Modelling Performance Using Images

Digital images provide performance models for students to observe and imitate, while also offering precise feedback for improvement.

8. Using ICT Monitoring to Collect Real-Time Data

ICT devices can collect and record real-time performance and fitness data.

9. ICT Support for Teachers

ICT supports teachers in:

- Improving lesson design.
- Transforming teaching and learning processes.
- Engaging and motivating students more effectively.

10. Video-Based Learning in Physical Education

a. Approximately 65% of learning in Physical Education occurs through visualisation.

b. Most traditional technology used in Physical Education slowed down the pace of lessons.

c. Many teachers still have a limited understanding of the possibilities offered by modern software and technology in Physical Education.

Impact as whole

1. Centralise ICT within PE to increase learning for all.
2. The aim is to spark enthusiasm, change practise, raise standards and improve learning.
3. Founded upon the notion that Physical Education is a visual and practical subject
4. Not just for the minority of children, aiming to impact at all levels of Physical education, including those with low motivation and low levels of achievement
5. Looking to engage children through actual subject content changes
6. New vision, Change the vision of what is possible
7. Very much focused on relating to learning objectives and child cantered learning.
8. Let them to the analysis of their own performances.

Challenges for PE

1. Maximise the use of ICT in PE based work
2. Develop the skills needed by PE teachers to use Digital Image feedback effectively.
3. Be clear about the impact of digital Image feedback on learners in PE.
4. Be clear about the benefits of the use of Reference Images to support learning in physical education.
5. Teaching strategies can be varied when integrating ICT and consideration should be given to.
6. Group work.

Other issues to be considered when attempting to integrate ICT in teaching include:

- The confidence levels of students in using ICT.
- Classroom management.
- The importance of focusing on the learning process not the tool.
- Diversity of the student group must be accounted for in planning.

Managing Resources

- Organising the teaching space
- Clip management
- Reference/Teaching clips

Impact on Teachers

- Clip selection at lesson planning stage
- Highly efficient video clip management

- Clarified expectations
- Highly motivated pupils, = increased pace of learning/mastery
- Potential to share video content on line
- Improved subject knowledge

Impact on Pupils' Learning

- More precise feed back
- Learning = more focused
- Better understanding of technical skills
- Better motivation (all ability groups)
- Improved understanding from evaluation of own movement and comparison of others. Kids are motivated by it
- They love it
- It puts them more in charge of their own learning‖

Challenges for the PE Profession

- To up-skill PE Teachers' ICT/image management skills
- To resource teaching areas to provide for digital image feed back
- To develop digital content
- To be precise about what clips we need for particular teaching situation
- To ensure that the new generation of physical educators are skilled
- To create A DIFFERENT TEACHING CULTURE
- Parental permission
- Defining the use of content
- In House use of video/digital stills
- Publishing images
- Filming Guidelines

ICT applications can improve the learning process in physical education. The students and the educators can both benefit. It is an integral part of education.

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