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**ABSTRACT**

The technological advancement has made the teaching and learning process also dynamic. The new techniques have enhanced the level of teaching as well as learning. The acceptance of modern technology in teaching pedagogy is a paradigm shift in the existing scenario. Now it is increasingly possible to teach on model basis. The actual feel of the activities due to action is possible and the virtual things are looking like actual without wasting material. The shift has resulted in increased optimal manufacturing. The field of Engineering & Technology has been revolutionized by such techniques.

**Keywords:** ICT, Virtual classroom, bandwidth, integration, Taught.

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**INTRODUCTION**

The world is dynamic, everything is changing for betterment. The field of imparting technology is also bound to change and teaching and learning has to become innovative and fun loving ones. The population burst is also posing limitations to the masses to get effective and quality education and this is compelling the integration of technology to combat the shortage of actual class room, power ;point , models, human resources. We are able to tackle masses in interactive ways by means of this interaction which is possible because of modern development of technology and its uses for masses. We need to look at the scenario in different ways. We will examine the subject in light of

1. Integrating Technology in the Instructional Machine
2. ICT as a Teaching and Learning Tool
3. Why Integrate Technology?
4. Roles of Educational Technology in Learning
5. Using Technology to Improve Teaching and Learning

Each one will be taken and the points will be put forth briefly.

**Integrating Technology In The Instructional Machine**

In this case the technology, its integration, instruction and instructional machine need to be explored.

Technology should not be seen as competitor but it should be treated as a complement to instruction to infuse

- Motivation among teacher and taught
- Modern needs of education can be put on canvas on a better way and this will detail in Identifying the needs of modern education: technology incorporation into educational instruction
- It needs proper Designing and implementation with applied projects to enhance technology integration in a specific school district
- Outline the basic objectives and goals
- It must introduce principles, procedures, and techniques, used for efficient technology integration
- To have an edge on other it must be of Cutting-edge science requirement technology

The Institutions and Regulators i.e. the implementing agencies must go for applied projects with an eye on Successfuland sufficient grants for proposals and funding appropriation and Building a cost effective i.e. low-cost point-of-service computer station system.

The best theory and practice of technology integration should be for an aim of the education of the future with the technology embedded in it, as I see it, will be conducted through the medium of the motion picture, a visualized education, where it should be possible to obtain one hundred percent efficiency.

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In view of the fast changing scenario in coming ten years, textbooks as the principal medium of teaching of day will be nearobsolete or at least preferred as the horse and carriage are now.

The Five Elements for effective Technology Incorporation are

1. Access,
2. Resources,
3. Integration, and
4. Guidance
5. Connectivity

We can visualize a New Era of Instructional Methodologies with the undermentioned line of action of : Teacher-centered to active-interactive student-centered approach Here teacher becomes facilitator / leader providing guidance.

Most common obstacles along the Path of Technology Incorporation are limited teacher proficiency and lack of training and the willingness to change i.e. “ inherent inertia to change” limited availability of hardware and budget constraints and willingness for change.

An area of Technology Incorporation and the Learning Process will evolve with “Authentic learning” methodology , leading to hands-on, enquiry-based activities using the scientific method of investigation , leading to real-life situations / problems identification and solutions of these.

“Problem-based” instruction will lead to Learning through discovery and exploration using previously acquired knowledge or expertise for higher-order-thinking, mental bridges, critical thinking .

A typical model of Instruction for Effective Use of Technology will evolve and can be seen as based on model of

1. Analyze the Learner
2. State Objectives and Expectations
3. Select the Materials and Media
4. Utilize the Materials and Media
5. Require Student Participation
6. Evaluation and Feedback

As an tool and effective mode of education Modern science requires technology which will be based on common needs namely

1. Computers are needed to progress in cutting-edge scientific research
2. Computer programming opens the scientific investigation to a virtual modeling world of extreme complexity
3. Computer simulations of complex systems allow predictions and discoveries otherwise unachievable through human brain power alone
4. Modern science is intimately integrated with technology and permeates all aspects of our everyday life

When science is taught out of context students without feel of what actually is happening the learner loose interest and motivation which can be restored with Computer technology which allows individual to bring the science of the real world inside the classroom in a virtual environment

Major task will be mobilization of resources and Securing Funding for Technology Integration. This can be met by allowing institutions budgets to be raised in phased manner not large enough to accommodate all requests for technology upgrade at all levels across the curriculum at one go. Provision for updation of technology (hardware and software) becoming obsolete at a very fast rate should also be kept in mind.

Funds for technology integration for Multimedia Technology Capabilities Enhancement at the learning sections ,dedicated TV set equipped with a DVD/CD/VCR player , Science and Technology of the Industrial World within the Classroom Walls , provision for replacing some of the laboratory activities of

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Chemistry/Physics courses with self contained virtual modules dealing with real problems from the perspective of a technician working in an industrial plant application of “Authentic learning” methodology and “Problem-based” instruction has to be worked upon.

### **Ict As A Teaching And Learning Tool**

All are aware of the fact that this offers a virtual scenario and has all merits but there are some Obstacles to Using ICT Effectively which can be listed as

The use of ICT as an effective tool for student learning inspired a growing debate among educators and policy makers.

Teachers, students, parents and many others with an interest in technology integration frequently are overwhelmed by providing and assessing quality technological instruction.

Although this outcry created many obstacles to the effective integration of technology into educational programs, there are two major factors responsible for this. The factors are:

1. Implementation aspect and inadequacy and
2. Lack of teacher support

Implementation Aspect is based on absence of a Shared Vision which is due to the impetus for a technology initiative stems from the educational policy makers. In case the vision is not adequately communicated to the teacher, the success of this technological initiative will not be effective and the initiative will be in jeopardy. Implementation of technology into educational programs fails when the initiatives do not originate or are not shared with the teachers

### **Implementation Barriers**

Broadly the barriers can be listed as Variances in Objectives which is mainly due to fact that when technology is integrated, it is used in a seamless manner to support and extend curriculum objectives for engaging students in meaningful learning. It is part of the daily activities taking place in the classroom and not something one does separately.

The broad initiative to incorporate technology effectively into day to day classroom instruction begins with eye on curriculum objectives for arising at a consistent goal. Here basic factor of mismatch between values of the teacher and the technology initiative will can also cause incorporation failure.

Infusing of technology initiatives into curricular aims, objectives and standards allows teachers to readily create meaningful learning exercises and experiences for students and will inturnincrease technological learning meaning increased literacy.

Other aspect of Implementation Failure can be improper Planning and Leadership issue also.

Academic requirement, technology planning and leadership in order to ensure the success of integrating technological initiatives. This involves the provision of clear goals and a collaborative effort between the policy makers and all educational stakeholders

Failure to provide sufficient information regarding inservicing or modeling of effective technology usage will lead to unsuccessful implementation

Integrating technology into the curriculum basically requires:

- Multiple professional development opportunities,
- Shared vision, and
- Time for professional interaction and planning.

Implementation Failure: Lack of Access and Resources: Basically the successful tech programs and initiatives hinge on:

- Clear vision and

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- Availability of the required technology
- Proper networking and
- Proper implementation and tech support.

Immense frustration and eventual abandonment of initiatives occur if teacher are unable to access adequate technology and fail to get proper response.

This highly technology based resource-intensive endeavor is a continual process as technology continues to evolve and is fast changing with advancement in almost all spheres. Technology continued upgradation, readiness in availability of support, and extremely low student/computer ratio.

Implementation Failure: Remedies can be formulated as

1. As teachers, administrators, and policy makers ensure to develop a unifying set of goals that links technology initiatives to overall curricular goals,
2. Teachers are provided sufficient time to upgrade themselves, procure resources and get opportunities to implement the use of technology in the classroom.
3. During teachers' investigation of their values and instructional practices in regards to technology integration, support is readily available which may include professional development opportunities and provision for professional discourse.
4. Fostering a positive climate allows teachers to engage in risk-taking and modify their beliefs of how students learn in a technology advanced environment.
5. Lack of Teacher Support, Computer access and to other forms of technology have dramatically increased.

It is well evident that the level of classroom utilization does not correlate with this significant rise. Despite of improved access, several factors prevent the effective integration of technology into instruction and this leads to poor implementation.

These barriers stem from a lack of teacher support.

1. Lack of Teacher Support: Teaching Conditions
2. Technology initiatives can only be successful if they are compatible with the conditions of teaching.
3. If inadequate computer access or if there is a high pupil/computer ratio, teachers will be reluctant to employ technology as an instructional tool.
4. The technology that is available must be reliable. Computers that are outdated or frequently requiring repair will cause frustration rather than a strong commitment to change.
5. The training of a teacher as a technical specialist is instrumental to successful integration. As the specialist provides suggestions for integration technology into the curriculum and instructional activities, teachers understand how technology can be used as an instructional tool across all disciplines.

Lack of Teacher Support: Technological Skill of Teachers

1. Teachers require continuous support and training to effectively integrate technology initiatives.
2. Successful technology integration involves the allocation of time for teachers to experiment with new technologies, collaborate with peers, and the provision of professional development opportunities.
3. As teachers collaborate and plan lessons that integrate technology, they reframe their perceptions towards innovative technology implementation and, ultimately, student achievement.

Lack of Teacher Support: Accountability

1. If teachers are held immediately responsible for changes that take time to show results, the process will undoubtedly fail.
2. Significant changes to perspective and pedagogy require time and support.
3. Exemplary technology use requires more than access and training; it also involves the support and mentorship to make the vision clear and attainable.

Changes in Teaching and Learning as a Result of ICT

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It appears that major changes in the ways in which teachers and learners view and practice teaching and learning may result from the shift to using ICT.

From ICT in the institutions

1. ICT is used as a tool for complete institution improvement;
2. A hugely powerful medium for transforming teaching and learning
3. It would seem that the shift is not just about technology. It's about learning to work collaboratively to construct meaning.
4. It's a shift from a philosophy which supports a transmission model of instruction one which embraces constructivism, in which learners construct their own knowledge out of their resources.

In the foregoing discussion the role of teachers is becoming highly critical and hence here the important in this case that What Do Teachers Believe to be Their Role in the Future?

Points are various as it can be listed as:-

1. Some teachers made the point that they thought that "the main role of the teacher [was] in helping students to learn" and that was not going to change, but how that objective is accomplished would change"
2. Teachers see their role evolving around character building and teaching morals and ethics to students who are spending time in front of a computer.
3. The 'tech-generation', will acquire powerful, decision-making positions in approximately 10 years. Their knowledge and abilities about using technology will influence educational direction and result in major innovations.
4. The creation of a virtual classroom or institution where students would connect with teachers and other students face to face at least virtually.
5. Teachers who are experts in certain fields can also offer specific disciplines over the Internet to numerous students in various places.
6. Few faculties believe that software programs, like PowerPoint and other presentation programs, will have a profound effect on student assignments and homework projects.
7. Typically few faculties may like students to take more responsibility concerning learning.
8. Educators would become less like a teacher and more like a facilitator.

The traditional physical structure of classroom would be reorganized. The bench & desks and chalkboard / white board at the front of the class be removed and the new classroom would be replaced or in other words may resemble like a library where students have freedom to openly and independently search for information and knowledge through access to technology.

In above background the basic 3 Questions to Ponder & Discuss arises as:-

1. What have you experienced in your own work with regards to the use of ICT? If you have noted changes in your own philosophy or practice & describe.
2. If this is implemented successfully and there is adequate technology and teacher support, will teacher disposition and style of teaching play a role in the success of ICT initiatives?
3. If a true partnership between education and technology is created, how do we, as educational leaders, envision our teaching environment in coming years in incremental order from now.

### **Why integrate technology?**

Fostering technology integration puts the following things in to

- Universal student access
- Reliable networks
- Multiple opportunities for training and support

Environment which values experimentation and tolerates failures

How are faculty currently using technology?

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Commonly used technology by faculty members in high to low rating of use are as follows-

- Email
- Systems working from home
- Scholarly writing
- Presentations
- Internet Research
- Data analysis
- Online course materials
- Course materials in soft form

Things which bothers most are

- Access to vast repositories of information and resources
- reflection upon (and in some cases transformation of) the way we teach
- visualization and conceptualization
- opportunities to create engaged learners
- ability to accommodate varied learning styles
- Technology can support learning by facilitating
- exploration and analysis of information
- simulation of events or processes
- visualization of abstract concepts
- manipulation of variables
- construction of knowledge
- practice and drilling of skills

Some ideas which may reduce the botheration

- Instead of writing comments in the margins of students' papers, you can have students can send papers via e-mail. Then, using a microphone attached to a PC, you can make audio comments on the papers. If you return the papers via e-mail, students can listen to your comments with headphones or speakers.
- Or, to save disk space, you can use the annotate feature in Word

### **Roles Of Educational Technology In Learning**

Technology can play a traditional role i.e. it can act as delivery vehicles for instructional lessons or in a constructivist way can create partners in the learning process.

In a constructivist way, technology helps the learner build more personal interpretations of life in her/his world and conserve and bring it for better learning. Technology can act as a learning tool for learning with not from. It makes the learner gather, think, analyze, synthesize information and construct meaning with what technology present in a new dimension. Here we can think different perceptions which can be listed as

1. Technology as tools to support knowledge construction mainly for
  - presenting learners' ideas, understandings and beliefs
  - producing organized, multimedia knowledge bases for learners
2. Technology as information vehicles for exploring knowledge to support learning by constructing for:
  - accessing needed information
  - comparing perspectives, beliefs and world views
3. Technology as context to support learning by doing for
  - representing and simulating meaningful real-world problems, situations and contexts
  - representing beliefs, perspectives, arguments, and stories of others
  - defining safe, controllable problem space for student thinking

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4. Technology as a social medium to support learning by conversing for
    - collaborating with others
    - discussing, arguing, and building consensus among members of the community
    - supporting discourse among knowledge building communities
  
  5. Technology as intellectual partner for
    - helping learners to articulate and represent what they know
    - reflecting on what they have learned and how they come to know it
    - supporting learners' internal negotiations and meaning making
    - constructing personal representations of meaning for supporting mindful thinking

Proper implementation of technology in the classroom gives students more “control of their own learning trends to ones that are more learner-centered.

Educational technology plays different roles which may vary from traditional point of view, it serves as presenter of knowledge just like teachers to the most sophisticated soft options. It may also serves as productivity tool. Internet, technology has facilitated communication among users so from constructivist's perspective, educational technology is a meaningful learning tools for serving as a learning partner

#### **Using Technology To Improve Teaching And Learning**

Technology needs to be used mainly because of

- Interactivity
- Content delivery/revision
- Managing learning and resources
- Collaboration
- Communication
- Sense of cohort
- Variety of teaching and learning preferences

Formative and summative assessment helps us in by way of allowing

- students more control of their own learning
- lecturers to guide more, teach less
- student to build up knowledge, and become part of the teaching process
- some really engaging learning experiences
- scaffolding and safety nets to faculty
- students identification more quickly who are high risk

Collaborating can be very well supported by Technology Development Cycle mainly by proper

- defining the problem
- choosing best way of tackling it
- Planning
- Development
- Testing and
- Evaluation

Warnings of such technology driven systems may suffer by limitations or shortage of

- Time to plan
- Time to develop
- Time to evaluate
- Time to be involved
- Obsession/addiction
- Use of students' private, social spaces
- Authenticity/authority of web content

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**CONCLUSION**

We see that Using Technology to Enhance Student Learning: Uses, Impact & Next Wave is based on General Thinking About the Use of Technology in Teaching. Use of Technology, including, information technology (IT) has great potential to support improved student learning with a rider that there is nothing inherent in the use of technology in teaching, by themselves, that would lead to improvement in student learning.

Innovations in teaching that lead to improve student learning are possible without technology but the capabilities of IT make them easier, more practical, and perhaps more engaging for students. Use of technology, including IT, is evolutionary rather than revolutionary.

Technology can Enhance Student Learning by improving Basic Skills Instruction by means of Computer assisted instruction, Multi-media software - teach to a variety of learning styles, videodiscs - strengthen basic skills, Video and audio technologies - bring material to life, Distance learning - at least as effective as traditional methods of instruction, all forms - develop new skills related to use of technology itself, necessary in workplace when he goes in employment.

Technology is Used to Enhance Student Learning by Advanced Skills Instruction through interactive educational technologies which may include Computer-generated simulations, Videodiscs, Internet, CD-ROM / DVD mainly enabling the students to learn to: organize complex information, recognize patterns, draw inferences, communicate findings, Learn better organizational and problem-solving skills.

It further bringing exciting curricula based on real-world problems into the classroom, provide scaffolds and tools to enhance learning, Give students and teachers more opportunities for feedback, reflection, and revision, Build local and global communities that include teachers, administrators, students, parents, practicing scientists, and other interested people; and expand opportunities for teacher learning. Technology Impacts Student Achievement, Attitudes & Behaviors in Quantitative and qualitative ways.

The quantitative approach provides modest increases in teacher given student's grade, largely increases in test scores for low achieving students and increase student understands of concepts.

On other hand the Qualitative approach improves student attendance, motivates and induces Interest, attitude, improves student retention, improve workforce skills and improves workforce placements..

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