Technology Integration Planning , Issues & Models

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Introduction

- Application of scientific rules and regulations

- Digital Technology describe use of digital resources to effectively find, analyse, create, communicate, and use information in teaching learning process.

- Digital technology is becoming an operational requirement for people's work, social and even personal lives.

- preparing trainee teachers with appropriate digital technology application training and development is a core factor in the successful integration of digital technology in schools

Technology integration

- Technology integration is the use of technology resources -- computers, mobile devices like smartphones and tablets, digital cameras, social media platforms and networks, software applications, the Internet, etc. -- in daily classroom practices, and in the management of a school.

- "Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions -- as accessible as all other classroom tools." -- National Educational Technology Standards for Students, International Society for Technology in Education

When effectively integrated into the curriculum, technology tools can extend learning in powerful ways. These tools can provide students and teachers with:

- Access to up-to-date, primary source material
- Methods of collecting/recording data
- Ways to collaborate with students, teachers, and experts around the world
- Opportunities for expressing understanding via multimedia
- Learning that is relevant and assessment that is authentic
- Training for publishing and presenting their new knowledge

Types of Technology Integration

- It is sometimes difficult to describe how technology can impact learning because the term "technology integration" is such a broad umbrella that covers so many varied tools and practices; there are many ways technology can become an integral part of the learning process. Just a few of these ways are listed below -- but new technology tools and ideas emerge daily.

Online Learning and Blended Classrooms

- While online learning gains traction around the world, many teachers are also exploring blended learning -- a combination of both online and face-to-face education.

Face-to-Face + Synchronous Conversations + Asynchronous Interactions = Strong Online Learning Environment

Project-Based Activities Incorporating Technology

- Many of the most rigorous projects are infused with technology from start to finish. Sal Khan of the much-acclaimed Khan Academy personifies the blended learning movement. His team's herculean efforts to record thousands of videos, create practice problems, and build sophisticated back-end analytics are opening educators' minds to what is possible with online learning.

Learning with Mobile and Handheld Devices

- Once widely dismissed as distractions, devices like cell phones, mp3 players, and tablet computers are now being used as learning tools in forward-thinking schools. "Kids mostly see their cell phones as a social toy, not as a learning instrument," says Liz Kolb, adjunct professor at Madonna University, in Lavonia, Michigan, and author of [Toys to Tools: Connecting Student Cell Phones to Education](). "But if you can get them thinking of cells as an anytime, anywhere, Swiss Army knife-type data-collection tool, it can open up a whole new world.

Instructional Tools like Interactive Whiteboards and Student Response Systems

- In many schools, the days of green chalkboards are over and students are introduced with Interactive Whiteboards and Student Response Systems for their effective learning. The potential for using interactive whiteboards in class is endless including Digital storytelling, Creating, viewing, and annotating student PowerPoint and multimedia presentations in real time, Showing streamed or downloaded videos, Using online map and satellite imagery to teach geography, Displaying artwork or online museum presentations, Teaching students how to conduct research on the Internet, Working collaboratively on writing and editing exercises, math lessons, and science experiments etc.

Student-Created Media like Podcasts, Videos, or Slideshows

- One of the central ideas of digital or media literacy is that students should be come creators and critics, not just consumers, of media.

- Educational Uses of Digital Storytelling offers a range of resources and tutorials for educators, including a discussion about research and evaluation. The Center for Digital Storytelling has been providing training on and sharing information about this art form for more than a decade, both in the United States and internationally. Stories for Change is building a network of people who are involved in community-based digital-storytelling workshops.

Using Social Media to Engage Students

- Social media refers to the online tools that promote easy transmission of ideas and conversations. Social media tools include wikis, Facebook, Twitter, blogs, microblogs, digital poster tools, chat rooms, photo sharing, podcasts, txts, etc. Undoubtedly, the world as we know it is quickly becoming wired through social media. Therefore, It is quickly becoming our duty as educators in the 21st century to guide our students towards responsible use of social media. A teacher can set up kids with accounts at the Web site Delicious, which lets you store, organize, and share links -- for example, an annotated resource list you use on a project.

Game-Based Learning and Assessment

- There has been a lot of buzz about the benefits of incorporating simulations and game-based learning activities into classroom instruction.

Web-Based Projects, Explorations, and Research

- One of the first, and most basic, ways that teachers encouraged kids to use technology was with online research, virtual field trips, and webquests.

Collaborative Online Tools like Wikis or Google Docs

- Connecting with others online can be a powerful experience, both for teachers and for students. Read more about [Google's free offerings for educators](#) & also read an article about [the basics of how wikis work](#)

Why Digital technology integration in Education

- Fast Communication
- Excessive information/data Storage

- Decreasing cost of digital technology
- Use multimedia

- Finding or searching data through networks or internet
- Support Innovation & creativity

Planning Digital Technology Integration

- Digital technology integration is a complex process that is based on many factors including hardware and software components, people, and ideas. Digital Technology planning is the only key to organize all these elements together to reveal better results. Digital technology plan may suggest that digital technology integration is on the right track. As, Whitehead et al. (2003) recommend that planning digital technology integration assists the educational institutions to meet established digital technology standards" (p. 30).

- Baron (2004) proposed seven important factors for **effective digital technology integration planning**. They are given as under:
- 1. Digital Technology initiatives should be based on instructional goals of educational institutions or academic programs.
- 2. Digital Technology should also be connected to curricular goals and design.
- 3. Digital Technology and assessment procedures should be compatible with each other.
- 4. Teachers and digital technology should work together for successful students' involvement.
- 5. Teachers may need continuous pedagogical and technological support and training.
- 6. Community and parents' involvement may increase success chances.
- 7. Institution itself plays pivotal role in technology reforms (Barron et al., 2001).

Process of Planning Digital Technology Integration

Cradler (2004) studied beliefs and presented the following guidelines to creating a digital technology plan and its implementation.

1. Have rationale for the use of digital technological resources in teaching learning process

2. Involvement of administrators, teachers, students, parents, and community in the decision-making process related to acquisition of digital technology

3. Need to develop positive thinking for most cost-effective uses of digital technology

4. Alignment of digital technological tools and application with the curriculum

5. Identifying the specific training and assistance needs of teachers related to use of digital technology

6. Utilization of existing digital resources in accordance with the digital technology plan

7. Provision of funds to implement the plan

8. Evaluate progress of the digital technology to study its impact

9. Communicating steps for others to follow in adapting the digital technology plan

10. Coordination of digital technology plan with other running programs and projects

11. Teaching with digital technology that addresses the needs of all students

12. Guidelines and contextualization for the incorporation of latest digital technologies into teaching learning process

13. Developing Software and learning apps in accordance with digital technological needs of learners.

Key Challenges

Resisting attitudes of teachers

Lack of adequate training and experience

Accountability for test scores

Lack of access to internet

Poor searching techniques

Poor infrastructure of digital technologies

Models of technology integration

Welliver's Instructional Transformation Model 1990

Welliver's Instructional Transformation Model (Welliver 1990) has teachers progressing through five hierarchical states in order to integrate ICT effectively. This model is based on the following five steps.

1. Familiarisation
2. Utilization
3. Integration
4. Reorientation
5. Revolution

1. Familiarisation	Teachers become aware of technology and its potential uses.
2. Utilization	Teachers use technology, but minor problems will cause teachers to discontinue its use.
3. Integration	Technology becomes essential for the educational process and teachers are constantly thinking of ways to use technology in their classrooms
4. Reorientation	Teachers begin to re-think the educational goals of the classroom with the use of technology
5. Revolution	The evolving classroom becomes completely integrated with technology in all subject areas. Technology becomes an invisible tool that is seamlessly woven into the teaching and learning process.

SAMR Model of technology integration

- According to the SAMR model these two dimensions (substitution and augmentation) play an enhancement role in teaching and learning process. Puentedura (2013) describe Learning activities that fall within the substitution and augmentation classifications are said to Enhance learning, while learning activities that fall within the modification and redefinition classifications are said to transform learning. But when ICTs are used to transform (modify and redefine) the teaching and learning processes we significantly realize a redesign of tasks. For instance, in the modification dimension technology allows for significant task redesign (processes integrated with email, spread sheets and graphing packages) while in redefinition dimension technology allows for creation of new tasks previously inconceivable (visualizations tools, simulations). This model clearly describes how technology can sequentially be integrated in education without skipping any stage of development.

Redefinition
Tech allows for the creation of new tasks, previously inconceivable

Modification
Tech allows for significant task redesign

Augmentation
Tech acts as a direct tool substitute, with functional improvement

Substitution
Tech acts as a direct tool substitute, with no functional change

Transformation

Enhancement

Substitution

- Teachers or Students

- Paper Pencil/Notebook

- Microsoft Word

Augmentation

- Teachers or Students

- Microsoft Word

- **Spelling and Grammar Check, Dictionary usage, Inserting and editing shapes**
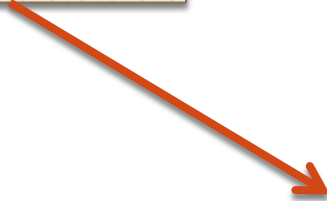
Modification

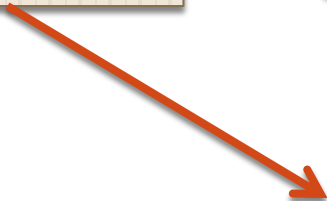- Teachers or Students → • Microsoft Word → • Google Docs

Redefinition

- Teachers or Students → • Google Docs →
  - Blogs
  - Wikis
  - Pods

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Technological Pedagogical Content Knowledge (TPACK)

- Mishra and Koehler (2006) suggest for teachers to integrate digital technology in their teaching, their technological knowledge, pedagogical knowledge and content knowledge should be synthesized to form TPACK

- The seven constructs of TPACK capture the different types of teachers' professional expertise needed for effective digital technology integration.

Content   **Pedagogy**   **Technology**
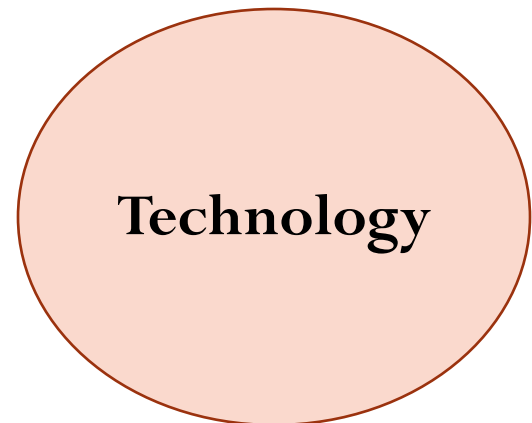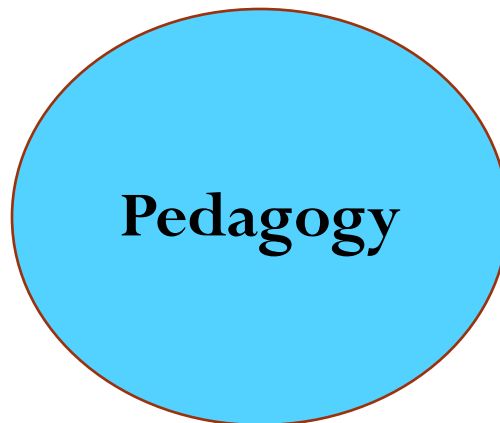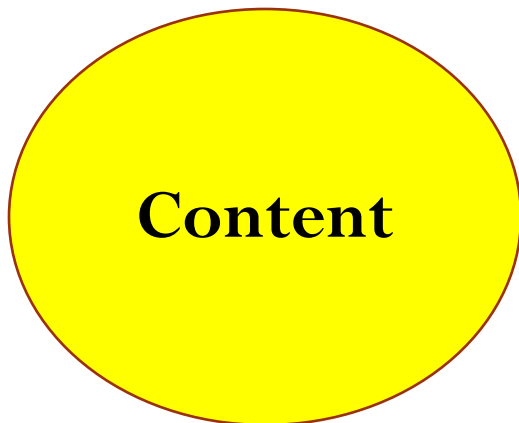
TPACK Explained

- a) Technological Knowledge (TK) – knowledge of how to operate computers and relevant software.

- b) Pedagogical Knowledge (PK) – knowledge of how to plan instruction, deliver lessons, manage students and address individual differences.

- c) Content Knowledge (CK) – subject matter knowledge such as knowledge about languages, Mathematics, Sciences etc.

- d) Technological Content Knowledge (TCK) – knowledge of how content can be researched or represented by digital technology such as using computer simulation to represent and study movement of the earth crust.

- e) Pedagogical Content Knowledge (PCK) – knowledge of "the ways of representing and formulating the subject that make it comprehensible to others" (Shulman, 1986).

- f) Technological Pedagogical Knowledge (TPK) – knowledge of how digital technology can facilitate pedagogical approaches such as using asynchronous discussion forum to support social construction of knowledge.

- g) Technological Pedagogical Content Knowledge (TPACK) – knowledge of facilitating students' learning of a specific content through appropriate pedagogy and digital technology.

Technological Pedagogical Content Knowledge

Pedagogical Content Knowledge

Content Knowledge

Pedagogical Knowledge

C

P

Technological Content Knowledge

Technological Pedagogical Knowledge

T

Technological Knowledge

Technological Pedagogical Content Knowledge

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