

Analysis of Integration of ICT (Information & Communication Technology) and Traditional Teaching in Education

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Abstract: Computer Based Learning (CBL) and teaching makes learning more efficient and more interesting to learners thus improving the quality of education. In order to appropriately integrate ICT for an improved education quality, technology and pedagogy must go hand in hand. ICT in education has a multiplier effect throughout the education system, by enhancing learning and providing students with new sets of skills; by reaching students with poor or no access (especially those in rural and remote regions); by facilitating and improving the training of teachers; and by minimizing costs associated with the delivery of traditional instruction.

Keywords: CBL, pedagogy, integrate, education, training

Introduction:

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. The integration and application of ICT within the learning process in the education sector is still in its infancy. New initiatives are still dominated by technical aspects. As the half-life of information continues to shrink and access to information continues to grow exponentially, schools cannot remain mere venues for the transmission of a prescribed set of information from teacher to student over a fixed period of time.

Objective:

Existing education technology should be adaptive to the needs of the current realities towards better integration of contents with ICT and their subsequent application in real world environments. The purpose for building ICT competency is students will be able to use technology in an effective and judicious manner, as well as to critically assess it. Integrating ICT means students are able to use technology when needed.

Attributes to be considered for teaching students by traditional & integrated mode:

1. Designing activities around teacher and student interests rather than in response to an externally mandated curriculum.
2. Having students engage in collaborative group projects in which skills are taught and practiced in context rather than sequentially.

3. Focusing on student's ideas and understanding rather than on definition and facts.
4. Teaching should be with the students while they are engage in their innovative ideas.

Categories of classroom practice	Traditional	Integrated
Classroom focus	Teacher centered	Learner centered
Teacher Role	Present Information & manage classroom	Model active learning & sometimes learner
Student role	Store information	Create Knowledge
Technology Content	Basic computer literacy with higher level skills	Emphasis on thinking and application
Role of technology	Drill and practice	Exploration and knowledge construction

Integrated methodological framework

Explore: A problem is always more meaningful if it is anchored in a student's reality. Teachers can encourage students to formulate questions about various issues faced by our society today such as urbanization, globalization, democracy, human rights, major religions, industrialization, the environment, demographics, etc. All these issues or social realities can be examined from a historical or geographical perspective. The important thing is to encourage students to not only formulate questions but also hypotheses in order to find possible answers to the questions they have raised.

Gather Information: Students must establish a research plan as well as develop work tools and ways of storing the information they find.

Organize Information: Students must synthesize the information they have found as well as examine and organize their sources.

Communicate: Students must select a way to share their results using text, graphs, images, video, etc.

A Model for ICT usage in teacher education

Welliver's Instructional Transformation Model (Welliver 1990) has teachers progressing through five hierarchical states in order to integrate ICT effectively. Figure 1 below shows these five states.

1. Familiarization	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.

Figure 1: Welliver's instructional transformation model

Using ICT to get students thinking

Students' access to technology at school and at home has increased astronomically. These initiatives have included extensive training schemes for all new and existing teachers in using ICT in subject teaching and learning. Following are the technologies used in ICT by the students.



Brainstorming

Brainstorming is a group or individual creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas spontaneously contributed by its member(s).

Brainstorming is a process for developing creative solutions to problems. Alex Faickney Osborn, an advertising manager, popularized the method in 1953 in his book, *Applied Imagination*. Ten years later, he proposed that teams could double their creative output with brainstorming (Osborn, 1963).

Brainstorming works by focusing on a problem, and then deliberately coming up with as many solutions as possible and by pushing the ideas as far as possible. One of the reasons it is so effective is that the brainstormers' not only come up with new ideas in a session, but also **spark off** from associations with other people's ideas by developing and refining them.

While some research has found brainstorming to be ineffective, this seems more of a problem with the research itself than with the brainstorming tool (Isaksen, 1998).

There are four basic rules in brainstorming (Osborn, 1963) intended to reduce social inhibitions among team members, stimulate idea generation, and increase overall creativity:

- **No criticism:** Criticism of ideas are withheld during the brainstorming session as the purpose is on generating varied and unusual ideals and extending or adding to these ideas. Criticism is reserved for the evaluation stage of the the process. This allows the members to feel comfortable with the idea of generating unusual ideas.

- **Welcome unusual ideas:** Unusual ideas are welcomed as it is normally easier to "tame down" than to "tame up" as new ways of thinking and looking at the world may provide better solutions.
- **Quantity Wanted:** The greater the number of ideas generated, the greater the chance of producing a radical and effective solution.
- **Combine and improve ideas:** Not only are a variety of ideals wanted, but also ways to combine ideas in order to make them better.

Brainstorming Steps:

- Gather the participants from as wide a range of disciplines with as broad a range of experience as possible. This brings many more creative ideas to the session.
- Write down a brief description of the problem - the leader should take control of the session, initially defining the problem to be solved with any criteria that must be met, and then keeping the session on course.
- Use the description to get everyone's mind clear of what the problem is and post it where it can be seen. This helps in keeping the group focused.
- Encourage an enthusiastic, uncritical attitude among brainstormers' and encourage participation by all members of the team. Encourage them to have fun!
- Write down all the solutions that come to mind (even ribald ones). Do NOT interpret the idea, however you may rework the wording for clarity's sake.
- Do NOT evaluate ideas until the session moves to the evaluation phase. Once the brainstorming session has been completed, the results of the session can be analyzed and the best solutions can be explored either using further brainstorming or more conventional solutions.
- Do NOT censor any solution, no matter how silly it sounds. The silly ones will often lead to creative ones - the idea is to open up as many possibilities as possible, and break down preconceptions about the limits of the problem.
- The leader should keep the brainstorming on subject, and should try to steer it towards the development of some practical solutions.
- Once all the solutions have been written down, evaluate the list to determine the best action to correct the problem.



Mind Mapping

A Mind Map is a visual thinking tool that can be applied to all cognitive functions, especially memory, learning, creativity and analysis. Mind Mapping is a process that involves a distinct combination of imagery, colour and visual-spatial arrangement.

The technique maps out your thoughts using keywords that trigger associations in the brain to spark further ideas.

Mind Maps can be drawn by hand or using software such as [iMindMap](#). When creating a Mind Map, there are several elements to consider including the map's central image, branches, colours, keywords and images.



Step 1. Create a central idea

The central idea is the starting point of your Mind Map and represents the topic you are going to explore.

Your central idea should be in the centre of your page and should include an image that represents the Mind Map's topic. This draws attention and triggers associations, as our brains respond better to visual stimuli.

Taking the time to personalize your central idea, whether it's hand drawn or on the computer, will strengthen the connection you have with the content in your Mind Map.



Step 2. Add branches to your map

The next step to get your creative juices flowing is to add branches. The main branches which flow from the central image are the key themes. You can explore each theme or main branch in greater depth by adding child branches.

The beauty of the Mind Map is that you can continually add new branches and you're not restricted to just a few options. Remember, the structure of your Mind Map will come naturally as you add more ideas and your brain freely draws new associations from the different concepts.

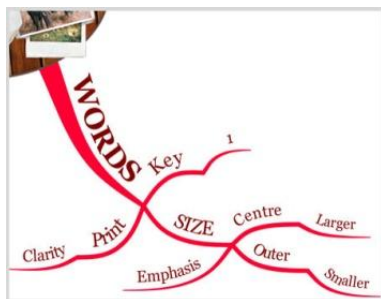


Step 3. Add Keywords

When you add a branch to your Mind Map, you will need to include a key idea. An important principle of Mind Mapping is using **one word per branch**. Keeping to one word sparks off a greater number of associations compared to using multiple words or phrases.

For example, if you include *'Birthday Party'* on a branch, you are restricted to just aspects of the party. However, if you simply use the keyword *'Birthday'*, you can radiate out and explore the keyword, party, but also a wide variety of different keywords such as presents, cake etc.

One word per branch also works well for chunking information into core topics and themes. The use of keywords triggers connections in your brain and allows you to remember a larger quantity of information. This is supported by Farrand, Hussain and Hennessey (2002) who found that medical students who adopted Mind Mapping experienced a 10% increase in their long-term memory of factual information.



Step 4. Colour code your branches

Mind Mapping encourages whole brain thinking as it brings together a wide range of cortical skills from logical and numerical to creative and special.

The overlap of such skills makes your brain more synergetic and maintains your brain's optimal working level. Keeping these cortical skills isolated from one another does not help brain development which the Mind Map seeks to do.

One example of whole brain thinking is colour coding your Mind Maps. Colour coding links the visual with the logical and helps your brain to create mental shortcuts. The code allows you to categorise, highlight, analyse information and identify more connections which would not have previously been discovered.

Colours also make images more appealing and engaging compared to plain, monochromatic images.



Step 5. Include Images

Images have the power to convey much more information than a word, sentence or even an essay. They are processed instantly by the brain and act as visual stimuli to recall information. Better yet, images are a universal language which can overcome any language barrier.

We are intrinsically taught to process images from a young age. According to Margulies (1991), before children learn a language, they visualise pictures in their minds which are linked to concepts. For this reason, Mind Maps maximize the powerful potential of imagery.



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