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CONSTRUCTIVISM AND INTIGRATION OF ICT: POWERFUL BLEND OF TEACHING – LEARNING PROCESS

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Abstract

Constructivism states that learning takes place in contexts, while technology refers to the designs and environments that engage learners. This study was based on two premises. The first concerns the implementation of the ICT-enhanced constructivist learning today in classroom. The second refers to the emerging need for the appropriate teacher education and professional development as a presupposition for the implementation of constructivist innovation in classrooms.

Keywords

Constructivism, Blended learning, ICT, Integration of ICT, Teaching-Learning Process

1. Introduction

Technology Integration for what?

Technology can and does help students develop all kinds of skills-- from the basic to the higher-order critical thinking ones. However, for technology to be successful, teachers need to make informed choices relating to pedagogical approach, students' needs, and learning objectives. Just as important as what technology is used, is how learning can be enhanced through technology.

Moreover, a teacher's philosophy of education and pedagogical praxis must play a vital role in forming one's theoretical framework for technology integration.

"Teachers are being asked to learn new methods of teaching, while at the same time they are facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom…but relatively few teachers report feeling well prepared to integrate educational technology into classroom instruction." - U.S. Department of Education, 1999. When teachers are asked if and how they integrate technology into their curricula, many answers appear. For example:

"I use the computer in my class as a reinforcement of topics we have covered."

"Students use the Internet to find information for their reports."

"I use PowerPoint to make all presentations."

Answers of all the Questions are given by 'The Cone of Learning.'

Figure 1: *The Cone of Learning*

Technologies do not guarantee effective learning. Yet inappropriate uses of technology can make learning more difficult. This is the case, for example, when students spend most of their time selecting fonts and colors for reports instead of planning, writing, and revising their ideas. Although technology integration is talked about a lot in education, very few educators have a clear vision or philosophy of what technology integration is all about. Moreover, if you ask educators how to integrate technology into the curriculum, very few will know how to go about doing it in a meaningful and purposeful way.

2. Pedagogical Approaches for Technology Integration

Accepted teaching and learning practices have undergone changes of revolutionary proportions in recent years. These changes are evident in situations as diverse as early childhood teaching, university physics teaching and workplace training. They have been underpinned by shifts in psychological and pedagogical theory, the most recent of which fit broadly under the heading of constructivism.

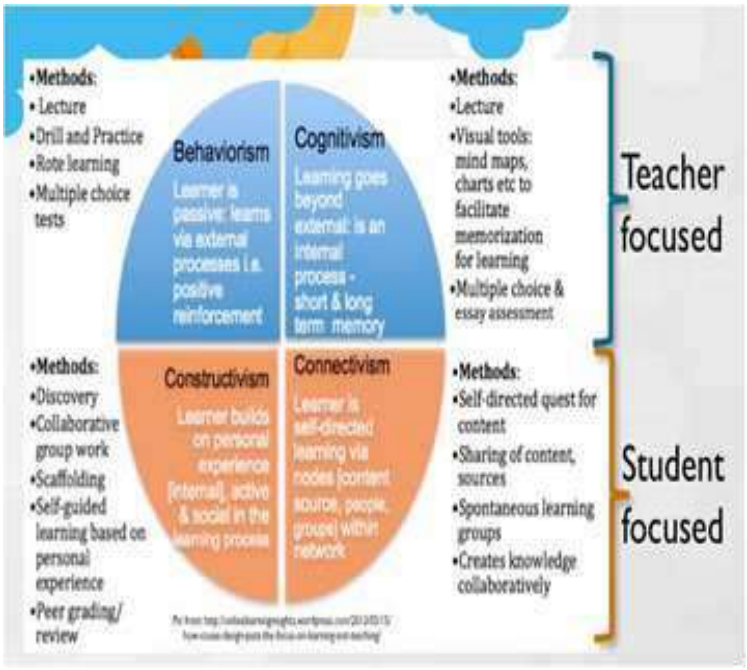

Figure 2: *Pedagogical Approaches & Methods*

The recent changes in teaching and learning practices have had their roots in two broad theoretical developments. The first development, in the field of psychology, has been the demise of behaviorism in favor of a movement broadly referred to as cognitive psychology. Behaviorism is based on the premise that it is meaningless to theories about the workings of the brain, since we can only study the behavior of people in responding to stimuli.

The consequence of this premise is that there is an emphasis on strategies such as repetition that encourage 'parrot' fashion learning rather than higher order cognitive processes. The cognitive psychology movement rejects this premise, instead surmising that a person's response to stimuli is individual and depends on the person's cognitive state and on the mental processes occurring. The important consequence of the cognitive position is that rather than being concerned with the best way to illicit the desired response, teachers are concerned with the

learner's cognitive activity and the mental models that they form.

This development alone, however, did not force widespread changes in teaching methods to occur.

There was a tendency to assume that although learners actively form a mental model of the knowledge they acquire, there is nevertheless some objectively 'correct' mental model for any given area of knowledge that learners should acquire. Consequently the focus continued to be on designing a single sequence of instructional events, with the rationale changing from reinforcing the 'correct' responses to stimuli, to 'transferring' the 'correct' mental model to the learner.

3. Technology Complements Constructivism

"Constructivism proposes that learning environments should support multiple perspectives or interpretations of reality, knowledge construction, and context-rich, experience-based activities."- David H. Jonassen.

The rapid development of increasingly powerful computer and communication systems has great implications for the constructivist approach to education. It offers a tremendous amount of information, tools for creativity and development, and various environments and forums for communication. Within a student-cantered curriculum based on student performance or research, new technology tools provide many opportunities for students and teachers to build knowledge in an engaged setting.

- The Internet and its graphic window, the World Wide Web, have made vast amounts of information available in a timely fashion.
- Students can initiate searches more and more independently using information technology.
- Teachers can encourage searching and classification more readily in a technology-rich environment. (Filtering software protects younger students from inappropriate areas on the World Wide Web).
- Primary source material is increasingly available in forms that allow it to be incorporated into student-created archives and knowledge constructions. Educational institutions have posted much material useful in the sciences, mathematics, literature, and social sciences. As one example, the Library Project contains primary source material from pioneers' diaries, the first recording studios, early photographers, and explorers' accounts.
- High-quality, current material on major events is immediately available. A landing on

Mars, a comet hitting Jupiter, a spacewalk, photographs and statistics of major storms. Students can research, classify, and store multimedia information from these events and more.

- Increasingly powerful software applications have put tools for interpretation and knowledge creation in the hands of learners of all ages and abilities.

Word processing and desktop publishing, databases and spreadsheets, digital photography and art applications, multimedia and Web-authoring programs have greatly enhanced students' potential for expression. These computer-based tools have tapped into students' multiple intelligences, and enabled those with aptitude in visual learning, for example, to demonstrate knowledge creation more effectively.

For example, teachers might organize the students to create a museum kiosk to demonstrate student knowledge.

- Computer technology has enhanced the opportunities for students to communicate with others.
- Students and teachers can extend their dialogue beyond the physical and time constraints of the classroom using e-mail, list serves, and live chats.
- Electronic-data archives, Web sites, and e-mail all allow for increasingly expedient and effective collaboration between students. Cyclic matrix can well explain the matter.

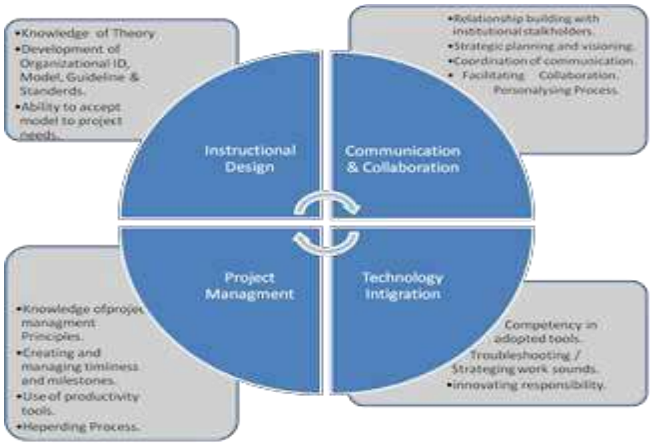

Figure 3: *Technological Integration & Learning*

The benefits of a constructivist approach, broken down by specific area of learning: Develop thinking skills.

- Problem solving teaches students to consider multiple perspectives on a given situation or phenomenon.
- This develops flexibility in thinking and reasoning skills, as students compare and contrast various possibilities in order to draw their conclusions.
- Students tap into their prior knowledge and experience as they attempt to solve a problem. Thus, students continually integrate new knowledge into existing knowledge, thereby providing context and creating a personal "storage room" of resources that will be available for future problem-solving needs.
- Students also learn to make connections and associations by relating the subject matter to their own life experience.
- Students learn to support their conclusions with evidence and logical arguments.
- Students learn to synthesize several sources of information and references in order to draw conclusions and then evaluate these conclusions.
- Students learn to question ideas and knowledge through the process of comparing and contrasting alternative ideas and contexts.
- Students are encouraged to engage in individual reflection in order to organize and understand the world.
- Students experience insights as they think through a problem or inquiry activity, and draw inferences that allow them to go beyond the simple acquisition of facts and information by learning how to see implications and apply them to other situations.

4.1 Develop Communication and Social Skills

- Students must learn how to clearly articulate their ideas as well as to collaborate on tasks effectively by sharing the burden of group projects. Students must therefore exchange ideas and so must learn to "negotiate" with others and to evaluate their contributions in a socially acceptable manner. This is essential to success in the real world, since they will always be exposed to a variety of experiences in which they will have to navigate among others' ideas. Students learn how to communicate their ideas and findings with others. This becomes a self- assessment activity, whereby the students gain more insight into how well or poorly they actually understand the concepts at hand.

4.2 Encourage Alternative Methods of Assessment

- Traditional assessment is based on pen-and-paper tests whereby students demonstrate or reproduce knowledge in the form of short responses and multiple-choice selection, which often inspire little personal engagement. Constructivist assessment engages the students' initiative and personal investment through journals, research reports, physical models, and artistic representations.
- Engaging the creative instincts develops a student's ability to express knowledge through a variety of ways. The student is also more likely to retain and transfer the new knowledge to real life.

4.3 Helps Students Transfer Skills to the Real World

- Students adapt learning to the real world, gaining problem-solving skills and ability to do a critical analysis of a given set of data.
- These skills enable the student to adapt to a constantly changing real-world environment. Thus, classroom learning does not result in (only) acquisition of a canon of absolute "truth"; it also results in a resource of personal knowledge.

4.4 Promote Intrinsic Motivation to Learn

- Constructivism recognizes and validates the student's point of view, so that rather than being "wrong" or "right," the student reevaluates and readjusts his knowledge and understanding. Such an emphasis generates confidence and self-esteem, which, in turn, motivate the student to tackle more complex problems and themes.

4. Conclusion

In order for technology to be used effectively in the classroom, teachers have to make sure that they are using it as part of an approach that involves the students in the activity. Constructivist approaches, with their focus on student-centered learning, have long advocated student involvement in the process of gaining knowledge and have sought ways for teachers to become advocates in the learning process rather than as figures who only dictate information. This approach seems to be a good match for the technological applications being developed today.

Technology as part of a learning theory is more than a tool; it becomes the framework for the

methodology. For those who are looking for ways to enhance their constructivist approach to instruction, technology provides the ability to support all of the central themes of this theory. Teachers are less hesitant to use technology because they can see that it helps them design their instruction in such a way that supports their theoretical approach. Using the two together – technology and constructivist theory – provides a better use and integration of technology tools into the classroom in an effective manner.

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