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Individual Differences and Use of Constructivist Approach through Technology

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Abstract:
The world is changing at a faster pace and to keep in line with the changing world we need to update our teaching-learning process. Technology has made tremendous progress in the past few years and the application of technology in our present day class room teaching can intern prove to be essential means to overcome the drawback of present Educational System. Class room instruction today has become more of a monotonous and passive activity. The students are the passive inactive listener who mugged up the content in the form it is being taught in class without giving it a second thought. In order to attain Quantity in Education we are losing out the Quality. Our students who are rankers out here at State and National level fail to complete at international level; Why? Its not that the students don't have ability to compete, they do have, but it's not nurtured the way it needs to be. The mere mechanical class room teaching of the concept will never create creative citizens. The innate ability of an individual cannot be changed, but of course the environment can be made facilitating and conducive for an individual. To make the class room environment conducive and enhance the teaching-learning process, Technology has major role to play. If the class room instructions include technical inputs, then it would enhance the concept clarity and perception of the students. Even the average and below average students can try to grasp the concepts according to his understanding instead being just passive listeners or seating in class with the absent mind. At least the picture or visual may arise the curiosity in a child and may be he starts thinking in his own rather than accepting blindly what is fed to him. The present paper is an attempt to relate the psychological aspects of a child with technical inputs to facilitate his wholestic development.

Keywords: *Individual differences, Indian classroom, Constructivist approach, Technology, Technical integration, Teaching-learning process*

1. Introduction

"Education is the manifestation of perfection already in man". Swami Vivekananda. Education works out to nurture the potentials of individuals for a wholestic development. Education today has undergone a major shift from traditional chalk and talk method to constructivist approach. The world is changing at a faster pace and to keep in line with the changing world we need to update our teaching-learning process. Technology has made tremendous progress in the past few years and the application of technology in our present day class room teaching can intern prove to be essential means to overcome the drawback of present Educational System.

Class room instruction today has become more of a monotonous and passive activity. The students are the passive inactive listener who mugged up the content in the form it is being taught in class without giving it a second thought. In order to attain Quantity in Education we are losing out the Quality. Our students who are rankers out here at State and National level fail to complete at international level; Why? Its not that the students don't have ability to compete, they do have, but it's not nurtured the way it needs to be. The mere mechanical class room teaching of the concept will never create creative citizens. Here Technology has a major role to play. It's said that, the more I see, the more I perceive.

An Indian class room consists of heterogeneous group of students. Catering to the needs of each and every one is not an easy task at all. Also we are bound to accept the individual differences in each student. The individual difference is basically due to the;

(a) Innate abilities.
(b) Environmental influence

The innate ability of an individual cannot be changed, but of course the environment can be made facilitating and conducive for an individual. To make the class room environment conducive and enhance the teaching-learning process, Technology has major role to play. If the class room instructions include technical inputs, then it would enhance the concept clarity and perception of the students. Even the average and below average students can try to grasp the concepts according to his understanding instead being just passive listeners or seating in class with the absent mind. At least the picture or visual may arise the curiosity in a child and may be he starts thinking in his own rather than accepting blindly what is fed to him.

The present paper is an attempt to relate the psychological aspects of a child with technical inputs to facilitate his wholestic development

2. Heterogenity in Indian Classroom

The entire school curriculum is designed keeping in view the Psychological growth of the child. If so then why the psychological aspect of child is neglected? when it comes to teaching-learning process. Psychologists say that "All individuals are different in degrees and not in kind." It implies that all students have the ability to grasp and conceptualize the concept, but the way they do differ from one another. A class room set up consists of a mixed group of intelligent v/s slow learners. To bring the two on a same platform is not our concern, what we are interested in, is to provide an exposure to knowledge and facilitate them to explore their own world.

Eminent Psychologist Bruner, Gagne, Eric Erickson and many others emphasize on the environmental factors contributing development of the Childs personality. Here the major emphasize is on the construction of ones own knowledge by the child. The teaching-learning process must be effective enough to plunder the mind of the child with questions like, Why, How, etc. Arousing curiosity in a child's mind is the basic purpose of the class room instruction. Even educationist now-a-days emphasize more on the construction of once ones knowledge rather than producing facts.
Learning is meaningful if all senses are utilized simultaneously in the process of acquiring knowledge.

As we move to the higher level of learning the abstractness in the concepts go on increasing. Mere verbal explanation can never reduce this complexity. Usually a teacher makes the child accept it as it is and moves ahead. The child takes it as it is, crams it or omits it as an option. All these are not healthy way of learning.

Here of course technology can prove to be a boon. Using technology in teaching of such concepts can provide a direction to a child's imagination. This will in turn lead to his concept clarity. Basically when a child visualizes a virtual image, he uses his senses of hearing as well as vision to perceive it. This helps in acquisition of higher order skills of reasoning (why) and analyzing it critically based on his prior knowledge. The retention of such processed knowledge from the information is of longer duration. A teacher's task of teaching gets fulfilled when a child can relate the concept to the world out side.

3. Constructivistic Application of Technology

We already discussed about facilitating each and every individual to actively participate in the teaching-learning process in classroom. To facilitate here means to provide them a medium which activate all their senses and make them a mentally ready to perceive and relate things. Even Gestalt, believes that the foremost principle which contribute learning is the principle of readiness; here we

mean physical and mental readiness. To make an individual ready to learn some stimulus which arise his curiosity should be provided to him. An environment for the stimulus of any of any of a wide range of devises and machines, physical systems, work environments, human and animal populations, individual processes, as well as natural or artificial systems can be provided through Technology. Here technology enables to the construction of knowledge. Here the concept of constructivist learning through technology gets focused.

Constructivism in education is the need of time. The constructivist approach through the medium of technology helps to achieve the major aims of education.
Biological science Curriculum Study (BSCS), explains the process of constructivism by employing five "E"s. they are Engage, Explore, Explain, Elaborate, and Evaluation.

1. Engage
In the stage engage the student first encounter and identify the instructional task. They need to be interested to engage themselves in the process. Here they make connection between past and present learning experiences, lay the organizational ground work for the activities ahead and stimulate their involvement in the anticipation of these activities. The technology can be a great help here as sawing the surprising event, and animated series (i.e. forming of a DNA structure, how a human body functions, eruption of volcano and the flow of lava, lifestyle of people at northern poles, icebergs in sea, the wild life and its habitat etc.) are ways to engage the students and focus them on instructional tasks. We won't be able to make them attentive unless their senses don't respond. Technology can in turn motivate them for active participations.

2. Explore
In the Exploration stage the students have the opportunity to get directly involved with phenomena and materials. Involving themselves in activities they develop a grounding of experiences with phenomenon. Here technology is the best source for exploration of knowledge. If technology is tactfully used to teach a particular concept; in depth detailed study could be done and concept clarity on part of the student be achieved. Even students can explore the ocean of knowledge through internet nowadays. The student's inquiry process drives the instruction during an exploration.

3. Explain
The third stage, explain, is the point at which the learner begins to put the abstract experiences through which s/he has undergone into a communicable form. Language provides motivation for sequencing events into a logical format. here each and every student have their own understanding. Learner support each other understands as they articulate their observations. Explanations from the teacher can provide names that correspond to historical and standard language, for student findings and events. For example a child through her exploration, may state they have noticed that a magnet has a tendency to "stick" to a certain metallic object. The teacher, in her discussion, may at this stage introduce the terminology referring to "an attracting force". The misconceptions can be removed during the discussion which facilitates even an average student to gain an insight of the concept. Created works such as writing, drawing, video or tape recording are communications that provide evidences of the learner's development, progress and growth.

4. Elaborate
In the stage four, Elaborate, the students expand on the concepts they have learned, make connections to other related concepts, and apply their understanding to the world around them.

For example; while exploring light phenomena, a learner constructs an understanding of the path light travels through space.

Examining a lamp post, she may notice that the shadow of the post changes its location as the day grows later. This observation can lead to further inquiry as to possible connections between the shadow's changing location and the changes in the direction of the light source, the sun.

Applications to real world event such as where to plant flowers so that they receive sunlight most of the day, or how to prob up a beach umbrella for shade from the sun, are both extension and applications of the concept that the light travels in a straight path. These connections often lead to further inquiry and new understandings which could be nurtured and motivated through technical inputs.

5. Evaluation

Evaluate, the fifth "E" is an ongoing diagnostic process that allows the teacher to determine if the learner has attained understanding of concepts and knowledge. The evidence of learning serve to guide the teacher in future technical lesson planning (Digital lesson plan) and may signal the need for modification and change of direction.

The learning process is open-ended and open to change. There is an on going loop where questions lead to answers but more questions and instruction is driven by both predetermined lesson design and the inquiry process. The constructivist through technology caters to the individual differences in a heterogeneous classroom set up.

1. It activates several cognitive process in the learner during learning including relevant information, organizing incoming information and integrating information with the existing knowledge.
2. It enhances the possibility of individualizing the educational process to accommodate the needs, interests, current knowledge and learning styles of each particular student to construct his\her own knowledge.
3. It leads to more positive attitude towards learning and it also increases student participation in classroom.
4. It provides opportunity to each student to explore his\her own knowledge.

4. Students Positive Attitude towards the Technical Approach

Researches show that students show a greater liking to the technology integrated approach in classroom rather than the routine chalk and talk approach. The main reasons they specify is because it is an

- Individualize learning
- Are self-paced
- Do not embarrass students who make mistakes
- Make it possible to experiment with different options
- Are more objective than teachers
- Free teachers for more meaningful contact with students
- Are great motivators
- Give a sense of heuristic learning to students.
- Are excellent for drill and practice
- Provides stimulus which arose curiosity to enquiry.
- Teach in small increments
- Build proficiency in technological use, which will be valuable later in life.
- Sensitize the hearing, touch and sight to perceive knowledge for longer retention.
- Helps to conceptualize the applications of the content in day to day life situation.

5. Hurdles in the Path of Technical Integration in Teaching-Learning Process

Up till now we discussed how technology proves helpful in the teaching learning process to cater the individual differences in the class. We are also in brief known from researches that students too like to learn through technological package.

Though technology has a number of benefits, it is not being used to the extent and way it could be used. Many hurdles come in the way of applying technology in the teaching learning process in the classroom.

1. Today some schools are equipped with latest hardware and software but benefit to student will depend on the skill with which (some) teachers are able to use these new tools.
2. In order to make effective use of educational technology, teachers will have to master a variety of powerful tools, redesign their lesson plans around technology enhanced resources, solve the logistic problem of how to teach a class full of students with a smaller number of computers and take on a complex new role in the technologically transformed classroom.
3. Teachers currently receive little technical, pedagogic or administrative support for these fundamental changes and few colleges of education adequately prepare their graduates to use information technologies in their teaching. As a result, most teachers are left largely on their own as they struggle to integrate technology into their curricula.
4. Moreover when teachers do make us o9f information technologies they are often used for either teaching students about computers or for drill and practice sessions focusing on the acquisition of isolated basic skills. Most teachers report that computers initially make their job more difficult.

Despite the daunting challenge of using computers and networks appropriately within an educational context, however, teachers commonly report that they have not received adequate preparation in the effective use of computers within the classroom.

1. Teachers often have a negative reaction to the narrowly technical orientation of most technology-related courses, which show them how to operate a computer, but not how to use computer to enhance their teaching.
2. Most teachers, however, cannot use computers effectively someone is available to help not only with the technical problems that are likely to arise from time to time but also with the deeper pedagogic challenges of choosing software, organizing project that make use of technology, and learning how to guide students in the use of computer-based resources.
3. The cost of the time that will be required for teachers to incorporate technology effectively within the curriculum will present a significant challenge – particularly during an initial transition period-to the effective utilization of educational technologies.
4. Even till today the acceptability on the part of teachers is also not that positive. The resistance to change is one of the major factors which hurdles the technology integrated teaching learning processes.
5. The courses at teacher training institutes which include information and communication technology are not fully justified. The syllabus is out-dated, and the teachers who teach this subject don't justify it. Resultant the student teachers who undergo such training are not efficient enough to in- corporate technology in their day to day teaching in class.

6. Conclusion

In our Indian classroom setup, the heterogeneity bound to exist. We never attempt to overcome it, but our attempt is to provide conducive environment which caters to the individual differences. The teaching-learning process must facilitate the gifted as well as the slow learners to perceive and understand the concept in a meaningful way. It must provide an individual to construct his own knowledge rather than reproducing facts. A constructivist approach through technology is the best means to cater the need of heterogeneous group. It encourages active participation on the part of the learner and helps them to explore and elaborate the fund of knowledge. Even students find it more interesting. Still practically we don't find the integration of technology in teaching learning process in most of the school. Many factors contribute to it. The major ones include the teacher's attitude and inefficiency to integrate technology to teach the subject content.

Looking at the data, over 200,000 new teachers enter the profession each year, and there is 50% turn over in the teaching force approximately every 15 years. While advances in underlying technologies, educational software and pedagogic methods will result in an on going need for in service training, colleges of education have a valuable opportunity to introduce feature teacher to the use of educational

technology before the demands of an actual teaching position begun to impringe on the time available for such training.

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