Details of Module and its structure

Module Detail	
Subject Name	Education
Paper Name	Perspectives, Issues and Research in Teacher Education
Module Name/Title	Integration of Information and Communication Technology Aided Constructivist Learning approach in Education
Module Id	e-PG EDN 10.34
Objectives	After going through this topic the students will be able to: ● To understand the concept of constructivist Approach and integration of ICT. ● To highlight the various issues of integrating ICT aided Constructivist Approach in education. ● To enumerate the paradigm shifts in education to explore ICT aided Constructivist Approach. ● To focus the various concerns of ICT aided Constructivist Approach
Keywords	Constructivism, ICT, Integration of ICT, and Learner centered learning

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1. Introduction:

Constructivism is one of the most influential theories in contemporary education and learning theory. Constructivism is a learning theory found in psychology which explains how people might learn and acquire knowledge. It is a theory suggesting that humans construct knowledge and meaning from their experiences. It therefore has direct application to education. Constructivism is not a specific pedagogy. Von Glasersfeld describes constructivism as a "theory of knowledge with roots in philosophy, psychology and cybernetics". Knowledge is not a transferable commodity and communication not a conveyance. Constructivism does not claim to have made earth-shaking inventions in the area of education; it merely claims to provide a solid conceptual basis for some of the things that, until now, inspired teachers had to do without theoretical foundation. Constructivism suggests that the learner's understandings of the way the worlds' work is the result of one's own active construction rather than someone else's presentation. Constructivist believes that knowledge is the result of individual constructions of reality. Piaget's theory of Constructivist learning has had wide ranging impact on learning theories and teaching methods in education and is an underlying theme of many education reform movements. Research support for constructivist teaching techniques has been mixed, with some research supporting these techniques and other research contradicting those results. It is believed that learning process, coupled with digital technology may bring educational systems into alignment with the emerging knowledge based information rich and technologically advanced society. Constructivist believes that knowledge is the result of individual constructions of reality (Brooks, 1990). Constructivism is meaning making activity and produces active learners and creative thinkers. But now there is a widespread concern that the educational experiences provided in many schools are not preparing students well for the future. It is believed that creating a paradigm shift in view of learning process, coupled with the application of digital technology may play an important role in bringing educational systems into alignment with the emerging knowledge based information rich and technologically advanced society.

Information communication technology (ICT) provides students with swift access to new information. Its reasonable application can make teaching more diversified, flexible, and effective; it facilitates Problem solving and offers learning tools which can develop critical thinking among learners. New information technologies, and particularly the Internet, are dramatically transforming access to information, hence changing the learning and research

process, how we search, discover, teach and learn.

ICT offers wide array for building new schooling systems that allows long distance exchange and interaction between geographically spread groups of teachers and their students meeting this challenge. In turn it requires collaboration across national, cultural, and institutional boundaries. Among groups and individuals who have been isolated.

With their increasingly ubiquitous presence within and outside the school, the Information and Communication Technology have begun to challenge what schools try to teach and the whole basis of assessing the knowledge and skills that students acquire. The process of education can no longer ignore the social and psychological impacts of the technology that structures the information and the possibilities that the global information sharing opens up, furthermore these technologies affect the way people think and learn has been widely recognized. Integration of ICT in schools therefore has a strong rationale and is natural sequence in the evolution of the schooling process. (NCF, 2000). It is only with new skills and perceptions that the teacher can assume her/his new role as a facilitator of learning and implement and maintain innovations in classroom. This call for a new definition of pre-service courses and effective training and orientation programmes for teachers, the new courses should help them to acquire skill of using ICT as well as making the best use of Computer technology in curriculum transaction (NCF, 2000).

2. Issues

There are volumes of writings and epistemological foundations on Techno-Constructivism, theoretically it has sound philosophy, roots and stems but still it needs to blossom and bloom through practices and research. The philosophy of learning of the people including learners, teachers, administrators, parents and the whole society coming under education sector is still static. It needs transformation.

It is evident at the lab level that the ICT Aided Constructivism is significantly effective, yet it needs a grass root theory for practical utility at the operational level. Practically implementing the Information and Communication Technology Aided constructivist Learning Approach in the classroom setting has several issues:

- In the Indian Context the Classroom environment is not conducive to the

implementation of the ICT Aided Constructive Learning Approach (ICTACLA). As the class size is big, managing this form of learning would be difficult through constructivist approach and even through ICTACLA.

- There is shortage of trained teachers and trained teacher educators in the area of ICT Aided Constructive Learning Approach. Teachers are required to be trained to use constructivist and cognitive tools and techniques well enough in order to facilitate their use by their students. Teachers have to develop new teaching skills. The teacher's role has to be changed from that of purveyor of knowledge to instigator, promoter, coach, helper, model, and guide of knowledge construction. Writing and scoring assessments of higher order thinking is new and difficult to the teachers. If these tools are used to engage constructive, self-regulated, critical, creative and complex thinking, then teachers are obligated to assess those kinds of constructive outcomes.
- There is a shortage of trained administrators in the area of ICTACLA. Committed teachers are not enough if the political leaders and school administrators are not themselves committed to building a thinking school culture. Enough time must be given to help students develop their thinking skills. There must be adequate administrative support.
- Lack of support from parents. Parent understanding and support is also needed. While all parents espouse the importance of constructive, self-regulated and critical thinking as important learning outcomes, most parents are more interested in comparing their children's grades than in understanding what their children are learning and experiencing.
- Lack of minimum facilities of Information and Communication Technology is also a major issue in this respect.
- Also Rigid disciplined classroom setting like infrastructure, sitting arrangement etc., are disrespecting the independency of the learners.
- The educational software which facilitate positive learning are not widely available.
- Development of the fully functional software by the learners and teachers demands thorough training.
- Constructivism seems to pass the onus of creating the knowledge to the student. It is highly desirable, but, relatively challenging.
- We usually have less faith in the learners to be the discoverers of their own learning

and creators of the meaning of learning.

It is preposterous to expect every student to be another Darwin, Newton and Einstein. Tobias (1991), but it is high time having faith in the learners to be the discoverers of their own learning and creator of the meaning of learning.

3. Concerns

To prevent constructivism from turning into a crudely relativistic form of construction-ism, which is likely to offend on psychological, ethical and political grounds, we need to ensure that the fruits of students' constructs are linked, appropriately, in order to qualify as genuine knowledge from the perspectives of experts within the ''real-world'' disciplines (Splitter, 2008).

According to Biggs (1993), students come to any learning situation with knowledge about learning, as well as prior knowledge in the content area, beliefs, abilities, motivations and personality traits as personal presage factors. These personal characteristics interact with the learning environment to produce a context-specific motivation to engage in a particular learning experience. This means that students read the learning environment, particularly the assessment requirements, and subsequently choose a strategy that parallels the learning motive for that particular context. So learning context should be set according to all the beliefs, abilities and motivations of the learners.

Not all learning materials should be considered as instructional materials. While many learning systems do not adhere to the values or traditions of instructional design, they are seldom differentiated accordingly. Constructivist approaches, for example, emphasize different kinds of learning, feature different kinds of methods, and are rooted in different epistemological frameworks. If we seek systems that support other kinds of learning, we need to better differentiate methods according to their consistency with various perspectives. For constructivist learning environments, it is important to understand how the core epistemological beliefs can be reconciled with, or necessarily depart from, other design practices.

4. Some Prominent Paradigm Shifts needed in education to implement ICTACLA:

- **Reproductive Learning to Productive Learning**

  Learners' achievements were measured against their ability to reproduce subject content, in other words, how well they could memorize and reproduce the content that the teacher transferred to them. With the emphasis on productive learning, it is rather about the application of knowledge and skills, in other words, what the learners can do after completing the learning process. Achievement is measured against the productive contribution a learner can make, instead of what the learner can reproduce.

- **Teacher-centered to learner-centered**

  The educational activities strongly focused on preferences and teaching style of the teacher that which would work best for the teacher, determined the design of the learning environment and the nature of leaning activities. From all these the preferences should shift to learner-centered learning. The learning environment should be designed according to the needs and possibilities of particular learner group.

Teacher-Centred and Learner-Centred Learning Environments

	Teacher Centred learning environments	**Learner centred learning environment**
Classroom activity	Teacher centred, Didactic	Learner centred, Interactive
Teacher role	Fact teller, Always expert	Collaborator, Sometimes learner
Instructional emphasis	Facts' memorization	Relationships, Inquiry and invention
Concepts of knowledge	Accumulation of facts, Quantity	Transformation of facts
Demonstration of success	Norm referenced	Quality of understanding
Assessment	Multiple choice items	Criterion referenced, Portfolios and performances
Technology use	Drill and practice	Communication, access, collaboration, expression

- **Teaching to Learning facilitation**

  Teaching as an activity of the teacher is seen as an activity that relates to the transfer

of content within a teaching-centered education paradigm. From this didactic environment to learning facilitation follows a learning-centered education paradigm should be followed. Teachers cannot be regarded as the only source of knowledge and cannot focus on the transfer of content method any longer. They need to focus on the facilitation of learning. Teachers cannot be considered as the fountainhead of information since the technology can provide students with access to an infinite amount of array of data and information. The role of instructor, therefore changes to learning facilitator. The instructor facilitates the environment so that the learner can access, synthesize and interpret it and draw the meaning out of it. The role of teacher has shifted from Knowledge transmitter, primary source of information, content expert, and source of all answers to Learning facilitator, collaborator, coach, mentor, knowledge navigator, and co-learner

- **Content-based to outcome-based**

  The emphasis from content based teaching-learning to outcome based that is reaching the prior set learning objectives meaningfully after the learning process.

- **Product oriented to Process oriented**

  In constructivist learning approach the process is considered as the heart of the learning, the emphasis is much on the process of learning that how we learn instead of what we learn. How the learners come to conclusion, how they relate the concepts to the prior concepts, and scaffold the relationships between the ideas and finally how they draw the meaning important rather scoring high on achievement test which would be held at the end of the session.

- **Content –based evaluation to outcome-based assessment**

  Here rather than highlighting on the evaluation of what content has been in the syllabus, teachers should assess outcome through transformation in terms of skills and applications, along with knowledge and understanding.

- **Knowledge production to knowledge configuration**

  As there is fast development in the field of ICT, increasing amount of information is available and accessible from all parts of the world. The days when information and knowledge were limited to libraries, books and experts are over. Knowledge production is making room for so called Knowledge configuration. Gibbons (1998) says in this context that “educational institutions greatly emphasized the generation of content for learning programmes in the past, the storage and re-use of content will

become more important. The generating of certain content might possibly not even happen at or through the institution itself, but elsewhere. The educational institution could possibly, in such a case, give attention to the evaluation, processing and packaging of the content. Over 90% of the knowledge produced globally is not produced where its use is required. The challenge is how to get knowledge that might have been produced anywhere in the world to the place where it can be used effectively in a particularly problem-solving context".

These paradigm shifts in education have contributed to ever growing need to innovate our educational practice and to explore new learning paradigms like ICT Aided Constructivist Learning Approach. ICTs are exerting impacts on pedagogical approaches in the classrooms. Their contribution to changes in teaching practices, school innovation, and community services is considerable. ICT is becoming more fitting to realize and implement the emerging pedagogy of constructivism. As already discussed it focuses on learner centered learning in following ways:

A. Active learning

ICT-enhanced learning mobilizes tools for examination, calculation and analysis of information in order to provide a platform for student inquiry, analysis and construction of new information. The learners therefore, learn as they do and, whenever appropriate work on real-life problems in-depth. Moreover, ICT makes the learning less abstract and more relevant to their life situations. In contrast to memorization-based or rote learning, that is the feature of traditional pedagogy; ICT-enhanced learning promotes increased learner engagement. ICT-enhanced learning can also be 'just-intime' learning that the learners choose what to learn when they need.

B. Collaborative learning

ICT-supported learning encourages interaction and cooperation among students, teachers, and experts regardless of where they are. Apart from modelling real world interactions, ICT-supported learning provides opportunity to work with students from different cultures, thereby helping to enhance learners teaming and communication skills as well as their global awareness. It models learning done throughout the learner's lifetime by expanding the learning pace to include not just peers but also mentors and experts from different fields.

C. Creative learning

ICT-supported learning promotes the manipulation of existing information and the creation of real-world products rather than the duplication of received information.

D. Integrative learning

ICT-enhanced learning promotes a thematic integrative approach to teaching and learning. This approach eliminates the artificial separation between the different disciplines and between theory and practice, which characterizes the traditional approach.

E. Evaluative learning

ICT-enhanced learning is student-directed and diagnostic. Unlike static, text or print-based education, ICT-enhanced learning recognizes the presence of different learning pathways to explore and discover rather than merely listen and remember. The discussion above clearly elaborates the role of ICTs in facilitating the pedagogy of schools in the information society.

"The Web is where constructivist learning can take place The web provides access to rich sources of information; encourages meaningful interactions with content; and brings people together to challenge, support, or respond to each other". However, merely providing students with access to the web does not guarantee constructivist learning. The lecturer is required to provide some guidance, or coaching to allow students to create their own meanings. The real classroom setting should be made favorable to implement ICTACLA. .

- Maintain a buffer between the learner and potentially damaging effects of instructional practices.
- Emphasize the affective domain also, and make instruction relevant to the learner.
- Help learners develop attitudes and beliefs that support both present learning and lifelong learning.
- Balance teacher-control with personal autonomy in the learning environment.
- Provide contexts for both autonomous learning and learning within relationships among students, such as, Group Discussion, Projection, Collaboration, as well as, Independent Construction.
- Provide reasons for learning within the learning activities themselves. Have students identify relevance and purpose.

- Promote and make conscious the skills and attitudes that enable a learner to assume responsibility for his/her cognitive and developmental processes.
- Use the strategic exploration of errors to strengthen the learner involvement with intentional learning processes and self-feedback.
- There should be availability of ICT facilities and creation of online community.
- Innovations in learning that we should expect are focused on personalized and adaptive learning, dynamic monitoring systems and integrating experience based learning into the classroom.
- Research should be done rigorously on constructivist learning approach and ICT enhanced constructivist learning approach.

5. Conclusion

"In order for any discipline to survive, it must accommodate changes in theory and practice and do so in a way that adds value to the discipline" (Kuhn, 1972). The constructivist view of the world gives new status to the learner as active agent of learning. Constructivist pedagogy offers a bold departure from traditional classroom strategies. The goal is for the learner to plan an active role in assimilating knowledge into one's existing cognitive structure. The constructivist approach requires the teacher to relinquish one's role as sole information–dispenser and instead to continually analyze one's curriculum planning and instructional methodologies. At the same time there are various new demands on the part of teachers. Constructivism is a culture - not a fragmented collection of practices. Crafting instruction based on constructivism is not as straightforward as it seems. It could be developed as a culture of the class. New insights don't happen by osmosis. They come from facing ideas that challenge the familiar ways of viewing issues - Earl & Katz (2002). Constructivism must be an extension of not a replacement for high quality curriculum. Out of all the difficulties to implement the ICT Aided Constructivist Learning Approach in the real class settings, there is ray of rhythm reflecting that one day this approach would find its grounded design, and it will be possible to implement it successfully in the real classroom setting & environment.