Promoting Constructivist Integration of Technology through Webquest

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This paper discusses the importance of technology integration in education in general and teacher education in particular. Technology by itself makes the classroom effective or do we have an appropriate model to integrate technology in effective way? Technology use should be embedded within a learning theory to support the methodology. Since the present thrust is on constructivist approach to teaching-learning, as it is also advocated by national level document, National Curriculum Framework 2005, therefore constructivism has been suggested as the framework for educational technology. Educational reform focused on the restructuring of education, incorporating constructivist view of learning and integrating uses of technology is the need of the hour. Using Webquest, allow us constructivist integration of technology, as it not only utilize technology in the form of internet based web resources but it is also based on sound principles of constructivism. Thus, this paper proposes the use of webquest as a means to achieve constructivist integration of technology.

[Keywords : Constructivism, Technology Integration, Educational technology, Webquest, Knowledge application, Scaffolding, Cooperative learning, Critical thinking]

1. Introduction

In the present educational scenario, the learner is considered as the centre of the educational system. To this end the focus has now turned to constructivist teaching practices from behaviourist teaching practices where learner was mostly passive. Constructivism allows for the active involvement of learner in the process

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of knowledge construction. With the growing use of technology, the constructivism has been reviewed to allow constructivist rich technology integration practices. Use of technology as a tool has empowered the constructivist teaching approach (Ford & Lott, 2012). Therefore, one can easily conclude that with the technology based teaching practices, constructivism has taken rebirth. Boethel and Dimock have emphasized that with the help of technology both teachers and students can expand on the information, individualize the process of education and make connections between the disciplines. But there is dearth of skills with the teachers to use technology. It is important that teachers inculcate in themselves the skills to facilitate teaching learning process using technology rich constructivist and conducive teaching practices that can replace the traditional practices (Boethel and Dimock, 1999).

Technology has got the potential to be used within every learning theory. The belief of a teacher in a specific learning theory or paradigm will have a significant effect on his/her integration of technology. In behaviourist paradigm the focus is on repetition and rote memorization without actual understanding. The learning is arranged in a systematic manner to enhance the mastery over content. Learners are required to learn skills and slowly move from the low levels to higher levels of cognitive domain of blooms taxonomy. Technology is utilized to work on the weaknesses of the learners, for enhancing the fluency and ample practice is given through tutorials, worksheets available online, drill and practice software etc (Hung, 2001; Roblyer, 2003).

While on the other hand, in constructivist paradigm the learners construct their own knowledge instead of merely receiving it passively from the teacher. The constructivism is build on collaborative and co-operative group learning and the stress is on authentic issues and finding creative and unique solutions to these issues. The role of the teacher is of a guide and facilitator who simply arranges the learning situations for students as they find the solutions to the problems. The curriculum is constructed in such a way that promotes acquiring lower and higher skills. The performance of the learners is evaluated through continuous and comprehensive measures like checklists, rubrics etc. Multimedia and simulation based software tools are utilized as technology inputs which stimulate cognitive skills resulting in enhanced and better understanding of the concepts. These can also be used to create presentations and collaborative group based projects which provides a platform to diverse learners to display their contributions.

Do we require a particular learning theory which can be used as a framework so that the outcome ie the learners can be more efficient effective?

Answer to this question, is affected by the shift in an emphasis from the behaviourist view of learning to a constructivist view of learning as advocated by a national level document, ie National Curriculum Framework-2005 for school education. Educational transformation has stressed on constructivist approach in learning and integrating uses of technology is the need of the hour.
Judson (2006) stressed on the relation between teachers with constructivist beliefs and their use of technology in the teaching-learning process. Researches have shown that teachers use and integrate technology more frequently if they have constructivist beliefs in comparison to teachers having behaviourist beliefs. Thus, there exist positive correlation between constructivist beliefs and use of technology by such teachers who have student-centered beliefs of teaching-learning process. The way the technology has been integrated with the content and frequency of usages of technology fosters student’s learning. The relationship between the teaching methods based on constructivism and use of technology suggest that teachers with constructivist belief use the technology more effectively as a learning tool. The amalgamation of technology uses and constructivist practices is the best way of using technology. Technology here is not an end itself, instead it a means to achieve the end (Rakes, Field & Cox, 2006). Teachers, these days, are not only willing to use technology in the teaching-learning context, but also willing to let the technology to change their pedagogic styles. If a teacher prefers constructivist teaching approach, he/she will also use the technology in the teaching-learning process. The World Wide Web (WWW) is important to instructional design based on technology (Lunenberg, 1998). Teachers need to consider the importance of World Wide Web while planning teaching-learning activities based on constructivism.

One of the possible ways of achieving this is through the use of webquest, as they not only utilizes technology in the form of internet based resources but also supports constructivist learning. Thus, pedagogy of constructivist learning can be empowered through the use of webquest in pedagogical process.

2. Webquest: An Introduction

Bernie Dodge came up with the term “webquest” in 1995 during the conception stage of world wide web. As the internet usage increased at the university, he experimented ways in which technology can be effectively merged with teaching-learning process. As a result of all his efforts, he designed an activity to integrate web in teaching process and named it “webquest”. Dodge (1997) defined WebQuests as “an inquiry-oriented activity in which some or all of the information that the learners interact with comes from resources on the Internet, optionally supplemented with videoconferencing” (as cited in Brito & Baía, 2007).

The definition of webquest given by Bernie Dodge failed to completely explain the real meaning and theoretical constructs of the concept of webquest. Therefore, co-creator of the webquest, Tom March (2008) has expanded the original version of the definition as follows:

“WebQuest is a scaffolded learning structure that uses links to essential resources on the World Wide Web and an authentic task to motivate students’ investigation of a central, openended question, development of individual expertise and participation in a final group process that attempts to
transform newly acquired information into a more sophisticated understanding. The best WebQuests do this in a way that inspires students to see richer thematic relationships, facilitate a contribution to the real world of learning and reflect on their own metacognitive processes.”

In essence it means that teachers search the reliable valid and useful web resources and give the annotated links to them. They also design a unique task linked with the resources (Dron, 2007). The idea is based on the fact that the World Wide Web contains such a vast amount of materials and information that renders it to a special educational tool. However, learners can easily be lost and distracted and thus need guidance if they are to benefit from the experience of surfing the Web. Therefore, teachers who use internet in their classrooms need to teach their learners how to effectively search for, access and evaluate information and they also have to limit their students’ adventures in order to avoid undesirable information popping up in the middle of their lessons. A WebQuest project offers a suitable framework for this as it employs critical thinking, relevant and contextual usage of web information; and inquiry-based learning (Chao, 2006).

The design of a webquest lesson plan comprise of six parts namely 1) Introduction, 2) Task 3) Process, 4) Resources, 5) Evaluation and 6) Conclusion. These parts are constructed in such a way that there are least chances for the learner to navigate to websites which are not related to the content under consideration.

The webquest parts have been described in following part:

2.1 Introduction

The purpose of giving an introduction is to give the learner some background or previous information on the topic under consideration. The introduction is designed to draw the learners in the task. It should have relevance to the interest and needs of learners.

2.2 Task

The task gives an explanation of what is required to be completed by students at the finishing point of webquest lesson plan. Here comes an important role of a teacher. The teacher is required to design the task or the activity or a problem in such a way that allows the learner to go beyond the knowledge and comprehension level of bloom’s taxonomy.

2.3 Process

This part expands on the “task” part described above. It lays down the step by step description of the process to be followed by the students. Here the students may collaborate with their group members in pursuit of completing the task. They also synthesize and analyze the information and apply their critical thinking skills to modify the information in accordance with the webquest task.
2.4 Resources

Generally the resources which are used in a webquest activity are available online. They can also be made available offline or in the print version. The teacher provides the list of the web based resources in the form of web links which are used by learners in the completion of webquest activity. This also prevents the learners from navigating to unrelated web resources. The resources are valid and reliable, since they are given by the teachers after through research.

2.5 Evaluation

The webquest also describes in detail the criteria and the dimensions on which the learners will be evaluated. The dimensions of the evaluation along with the allotted marks are provided with the webquest activity. Thus learners know in advance that on what bases they will be evaluated. Generally rubrics are used for the evaluation.

2.6 Conclusion

This part marks the end of the webquest lesson plan. Here the learners are provided with the information which may extends to other larger domains. They can also reflect on what they have learned. The purpose is to encourage the learner to gain an in-depth knowledge about the content just completed.

3. Web-Based Lessons, WebQuests (as described in UNESCO, 2002)

In a webquest, the information on which the learners work, to complete the webquest task is taken from the web. Therefore it is a task oriented activity. It is weaved around an authentic task which makes the best use of learners’ time. It allows the learner to use the information drawn in relation to the task under consideration and also enables them to apply their cognitive skills at the analysis, synthesis and evaluation (HOTS-Higher Order Thinking Skills) level of blooms taxonomy. The webquest model has relevance for all the stages of school and university education namely primary, elementary, secondary, senior secondary and graduate levels. They can also be utilized in variety of subject areas. in a lesson plan format it is best means to utilize the web resources towards educational ends.

4. Advantages of Using Webquest in Education

Lamb and Tecelehaimanot (2005) highlighted the benefits of webquest lesson plans. webquest have a tendency to transform the information consisting of mere facts and opinions in to an important learning experience. The webquest uses internet as the main source of information to complete the given task. The information is transformed by analyzing and synthesizing it. They have begun with a discussion on how webquests have their origin in the “constructivist philosophy, comprehension, authenticity, scaffolding, group based cooperative
learning, motivational, engaged learning”, context and situation prone learning milieu.

The idea of constructivism is based on the fact that knowledge is constructed actively by the learner. The role of the teacher is to merely arrange the learning situation. In a webquest lesson plan the knowledge is weaved in the webquest task in the form of internet based resources. The task which is designed by the teacher is such which enables the learner to transform the information by applying critical thinking skills: like analyzing, classifying, deducing and synthesizing the information as per task. The learners in a webquest activity do not summarize and report back the information but they work upon it and transform it to complete the given task. Thus we can say that webquest utilizes the web resources towards an educational end. So the most important thing in a webquest activity is the webquest task which should be engaging, motivating and authentic. The parts of the webquest have been designed in such a way that they not only provide the learner with both procedural and conceptual scaffold which encourages them to complete the task. Thus with the webquest lesson plan the chances are more that learners will be active, engaged, motivated and develops sound understanding of the concept being explained. The parts of a webquest lesson plan are also designed to enable both group based activities and individual based activities. They also promote inquiry based learning as each member in a group assumes a full fledged role which helps the group or the team to solve a problem. According to Stein (1998) learning environment which provide more rigour and concentration on the part of the learner while taking up a task allows learners to develop expertise in the topic and eventually the subject, as such learning environments provide opportunities to reflect on the knowledge received. They also support both learner and facilitator to be more constructive and productive. They trigger the critical thinking skills in the pursuit of solving a problem. Quite a number of educators around the globe believe that webquest lends such learning environment (Yoder, 1999).

Weinstein (2000) suggested that fostering critical thinking in the students the teacher should embed activities in the curriculum which elicits critical thinking of the students. Thus it is not a separate skill to be inculcated in isolation. Vidoni and Maddux (2002) in their study whereby they compared the design of the webquest lesson plan and the framework for critical thinking skills, came at the conclusion that the format of the webquest has all the six elements given in their framework for critical thinking. According to them, the parts and the structure of a webquest lesson plan is such which creates a learner-centered learning environment with teacher as a guide and facilitator. The students in this environment utilize their time effectively, they concentrate on the use of information and facts provided in the web resources rather than searching it on their own. They also allow the students to analyze, synthesize and evaluate the information, thus catering to higher levels of cognitive domain of blooms taxonomy.
5. Four Underlying Constructs of Webquest

The above discussion related to the advantages can be summed up under an umbrella term namely “constructs of webquest”. Webquest as an effective educational and instructional tool is supported by four latent constructs. These constructs are based on the principles of constructivism namely: knowledge application, critical thinking, social and collaborative skills and scaffolded learning.

5.1 Knowledge Application

Webquest requires learners to go beyond simply reporting back the factual information. Information gathered through the web-links is transformed and applied in relation to the webquest task. According to Pohan and Mathison (1998) webquest enables learners to build skills to apply what they have learned to the entirely new learning situation. Thereby, promoting application based learning. Learners here are not simply retelling the information gathered, rather the information is being worked upon in accordance to the task. Thus, information is utilized effectively and knowledge is transferred to the new learning.

Illustration: In a webquest focusing on understanding of three important theories of development in developmental psychology (Piaget’s cognitive development theory, Erikson’s psycho-social development theory and Kohelberg’s moral development theory), students are required to collect the information on the three theories through the web-links provided. After thoroughly understanding the theories, they need to choose a character from their neighbourhood and try to explain this character in relation to the particular stages of each theory by giving examples to support their claim.

http://www.questgarden.com/41/05/6/061108165848/index.htm

5.2 Critical Thinking

For the application of knowledge in accordance with the webquest task, critical thinking skills are required. A good webquest must engage learners in critical thinking. Webquest task should be such that compels the learners to analyze and synthesize the information by examining things from multiple perspectives. It is necessary that the webquest task should cater to the higher levels of the blooms taxonomy, thus webquest should be designed to facilitate the thinking skills of the learners at the level of synthesis, evaluation and analysis.

Illustration: In the previous example, the students need to apply critical thinking skills in order to arrive at the description of the character chosen ie they need to analyze, synthesize and evaluate the character from the different perspectives of the different theories. They will be classifying the sample behaviour displayed by the character chosen and then categorizing the behaviour in terms of the characteristics of the stages of different theories.
5.3 Social Skills

Webquest task can be designed to promote interpersonal and small group skills. Typically every learner who participate in webquest have a role which help their group to accomplish a task. Thus, their collaboration in webquest learning environment develops social skills by promoting interaction, interdependence and accountability among learners.

Illustration: The webquest on developmental psychology can also be tailored to make it a group activity, whereby students can be divided into the group of three. Each group member would study a theory in detail and then they can involve in a discussion whereby they can try to understand one another's perspectives and their arguments in support of their claims. They can collaborate to arrive at the description of the character chosen from the perspectives of different theories.

5.4 Scaffolded Learning

Webquests through their design, in the form of building blocks provides a scaffold to the learner. The Parts of the webquest are a strongly organized internet lesson which guides the learner towards the completion of the task within the allotted time. It enables the learners to focus on problems and connect between their learning activities and goals.

Illustration: Again, in the previous example, the webquest is designed in a manner to provide the learners with both conceptual and procedural scaffolds. The web-links listed in the resources section guides the learners to develop an in-depth understanding of the perspectives of each theories. The webquest is designed in a manner which at every step, guides the learner towards completion of the activity.

6. Webquest and Teacher Education

As per Strommen and Lincoln (1992) due to inadequate training provided in teacher preparation courses in teaching with technology, the current generation of student teachers are not well versed with the use of technology. As a consequence of this there is a mismatch between the schools and the needs of the society. (as cited in Matushevich, 1995).

The learning environment arranged by the teacher is the reflection of teachers’ perception of the teaching-learning process. There are certain factors in the learning environment prepared by the teachers on which the learning approach of the students depends. generally there are two learning approaches: deep learning approach and surface learning approach. Deep learning approach is in consensus with student-centered teaching approach. Learners who approach the teaching-learning with surface learning approaches have different values and as a result, a different perception. The perception and approaches of teachers, and the teaching-learning environment they provide affects the perception of students.
Successful integration of technologies resulting in improved and efficient learning is difficult to achieve unless teachers integrate and use technology as the inseparable part of teaching approach.

To integrate technology, teachers need to plan and facilitate students ‘learning experiences which enhance and foster pupils’ high-order thinking skills (Wenglinsky, 1998). Thus in order to cater to the changing needs of the society, teacher education programmes must include a technology related professional course so that the teachers can develop skills to successfully integrate technology in their teaching (Loveless & Pellegrino, 2007; Schrum, 1999). Thus, teacher education programmes must model the use of technology in the process of preparing teachers to teach in schools. If the student teachers get hands-on experience on using technology in their teaching then they are also able to design content based technology related activities (Loucks-Horsely, et al. 1998). Chou and Peng (2011) believe that Internet is a ‘double-edged sword’ with both boon and bane sides to it. On one hand internet with its information rich web resources offer plenty of opportunities to the students while on the other hand it is difficult to ensure the reliability and age appropriateness of the resources and content. Shopping sites, gambling sites, sexual content poses an altogether another kind of a challenge (Livingston, 2003). Thus teachers are reluctant to use internet and other technology based activities. Therefore, there is a need to guide them the ways which promotes risk free technology integration. If teacher preparation programmes will have appropriate professional development component, the teachers will be more at ease to teach with technology. King (2003) stressed on the use of webquest to give the pre-service teachers with sufficient understanding of integrating technology in their teaching and enhance their skills in using technology in class.

Teachers’ perception of integrating technology into instruction affects the integration in actual classroom situations. If the teachers have opposite mind-set regarding using technology in the classroom, they may consider it as a distraction or not worthy enough to be used. With such shallow approach towards technology integration they may not utilize it for integrating the same in the teaching learning process. According to Ertmer (2005), the ultimate decision of using technology in the classroom lies with the teacher. Therefore, the attitudes and beliefs of the teacher about technology integration need to be taken care of and attempts should be made to change their perception.

There are lot of instances which prove that the attitude and beliefs of teachers along with their own efficiency in teaching with technology plays a major role in how they perceive and use technology in their daily classroom instruction (Clark & Peterson, 1986; Zhao et al., 2002). Hughes et al. (2005) emphasized that if teachers think that there is a correlation with technology integration and the content which is taught, they will be more inclined towards integrating technology
into their pedagogy. The practical use of webquest in educational institutes has been well described by many scholars (Kundu & Bain, 2006; Zheng et al., 2005).

7. Conclusion

We have seen that constructivism is a preferred paradigm over behaviourism since it is in consensus with the learner-centered teaching-learning approach. NCF 2005 has also acknowledged the constructivist rich teaching-learning practices. In order to cater to the changing needs of the society, integration of technology into teaching-learning practices is the need of the hour. Thus there is a need to look out for ways and the tools which promote constructivist rich integration of technology.

Webquest allow us to achieve constructivist integration of technology, which is need of the hour. webquest have high relevance to teacher preparation courses which need to model the technology integration practices in order to equip teachers with the skills needed in today’s schools. On one side, webquest allow teacher to search the reliable and valid web resources on the internet so that the same can be utilized for technology integration. Thus teachers with less technological skills can make use of plenty of webquest activities available online. On the other side webquest develops skills in the teacher as well as in the learner to deal appropriately with the information. thus they have pedagogical value. Hence it can be conveniently concluded that webquest with its focus on constructivism based technology integration can prove to be an ideal and effective tool as the disposal of teachers in the 21st century.

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