Available online at www.jcsonline.in Journal of Current Science & Humanities6 (2), 2018, 1-7.

Impact Factor- 2.05

Original Article

Technology as an educational tool: A study on students' view on its usage

Slađana Živković, PhD
College of Applied Technical Sciences & Faculty of Civil Engineering and Architecture, University of Niš, Serbia
Email: sladjanazivkovic.ni@gmail.com

Abstract
This paper aims to emphasize the importance of using modern technologies in the classroom within the context of a constructivist framework. In today's technology-driven world universities require urgent reforms in order to transform the traditional paradigm of teaching and learning and to improve the quality and effectiveness of educational system. To meet these challenges, it is here proposed the implementation of digital technologies in the constructivist classroom in order to provide innovative, flexible and high-quality education, both theoretical and practical. As it is well known, the central characteristic of constructivism is that learning is an active process in which students construct new knowledge based upon their prior knowledge through interaction with the environment. The environment creates engaging and content-relevant experiences by utilizing modern technologies and resources to support unique learning goals and knowledge construction (Young, 2003). The use of technologies in the constructivist classroom enables students to be active and collaborative, which contributes to improving learning achievements and increasing learning outcomes. A pilot study examines students' perceptions towards the implementation of digital technologies in the constructivist-oriented classroom. Data were gathered through a questionnaire with the participation of 85 university students. The results show that students have very positive attitudes towards modern technologies and their usage in the constructivist learning environment. In other words, computer and the Internet support learning, improve students' motivation, enhance creativity, support innovation, increase autonomy, improve the collaborative process within teamwork, encourage discussion and develop technology skills.

Keywords: Digital technologies, constructivism, a pilot study.

Introduction

Considering current trends in education, it is necessary to transform the traditional paradigm of teaching and learning, toward the "learning paradigm" (Barr & Tagg, 1995), in order to improve the quality and effectiveness of education, To meet the challenges, schools and universities need to be transformed in ways that will enable students (future specialists) to be creative and innovative, to think critically and analytically, and to be able to solve real-world problems.

Corresponding author.
E-mail address:
(Rupesh Ajinath Pawar)
e-ISSN: 2347-7784

Fostering global awareness, the emphasis is on the need to prepare students for their future careers in order to become competitive and productive members of the 21st century highly fluid society and competitive market. Thus, students would be able to learn and work collaboratively in positive working environments of openness, trust, mutual respect and tolerance. In that way, students take full responsibility for their learning and knowledge construction in the context of contemporary life. As for the research on 21st century skills, it is of utmost importance to creating a computer-mediated learning environment that encourages success. Embedding technology support in the effective learning environment increases the potential to support insights into an innovative teachingand learning approach based on communication, interaction and collaboration (Vygotsky's social constructivism). The use of information and communication technologies (ICTs) in learning is a current challenge to rethink a number of educational issues, such as students' autonomy, motivation, and creativity, as well as the enhancement of cognitive power. As Perkins (1991) observes, it is necessary to activate learners and to support the construction of meaningful new knowledge on the basis of the existing cognitive structures. Cognitive tools, along with constructivist learning environments, guide and activate cognitive learning strategies and critical thinking (Jonassen, 1994). They can enhance the cognitive powers of learners during their thinking, problem-solving, and learning (Jonassen & Reeves, 1996). A student who uses a cognitive tool effectively should engage (actively), think (deeply), and articulate his/her knowledge (Jonassen, 1994).

The View of Technology as a Cognitive Tool

Modern technologies, (computers, together with the Internet), are an example of digital technologies whose role in education should not be viewed as an add-on, but rather should be viewed as an instructional tool for providing a richer and more exciting learning environment (Duffy & Cunningham, 1996).

Constructivism proposes various technologies to promote learning. Computers as mindtools (Jonassen et al., 1999) emphasises and promotes autonomous learning, supports interactive, collaborative, and student-centered classrooms. It facilitates cognitive processing and engages students in critical, higher order thinking about the content (Jonassen, 2000). In this way, the students learn with technology rather than receive information from the computer (Jonassen et al., 1999).

Information and communication technologies can support social constructivist learning in various ways, such as e-mails, dialogues, discussion, and debate.

If used appropriately, these technologies could add relevance and meaning to learning because it has the potential to increase students' motivation.

"This technology allows learners to do multiple language tasks, simultaneously integrating all the basic language skills--reading, writing, listening, and speaking. When used, it is an invaluable asset in the arsenal of language teaching and learning tools. Therefore, we must open the minds of the educators and motivate the learners by breaking down the walls of technical bias, unlocking the doors,and allowing the spider to cast her electronic World Wide Web of English around our students in and out of the classroom" (Wilson, 2004).

Designing and implementing digital technologies in the teaching and learning process is one of the most demanding tasks. So, the key challenge facing teachers is to refocus their teaching strategies and adopt new approaches, and to effectively and efficiently incorporate technologies into the language learning process. To be prepared for the new role in the 21st century, the teacher needs to maximize the potential of digital learning by using it effectively, efficiently and creatively, and to provide models and opportunities for practical work. It is essential to promote information literacy, support collaborative working practices, in order to prepare students for the 21st century workforce.

From the aforementioned, it is clear that constructivist pedagogical principles coupled with appropriate technology show

the potential for major improvements in learning practices. Together they provide the opportunity to make and remake the concept of learning, and have brought new possibilities for learning. In other words, they can allow students to learn to their fullest potential.

Technologies help build knowledge bases, which will "engage the learners more and result in more meaningful and transferable knowledge… Learners function as designers using the technology as tools for analyzing the world, accessing information, interpreting and organizing their personal knowledge, and representing what they know to others" (Jonassen, 1994). Duffy and Cunningham (1996) state: Technology is seen as an integral part of the cognitive activity….This view of distributed cognition significantly impacts how we think of the role of technology in education and training, the focus is not on the individual in isolation and what he or she knows, but on the activity in the environment. It is the activity – focused and contextualized- that is central... The process of construction is directed towards creating a world that makes sense to us, that is adequate for our everyday functioning.

Digital technologies can enable students to become more active and independent learners (Negroponte, Resnick and Cassell, 1997) argue that. Computers will allow students to take charge of their own learning through direct exploration, expression, and experience.

With the use of emerging technologies, collaborative learning has become easier to implement in the classroom, particularly important for areas where culture is being learned such as the foreign language classroom. The computer, together with the Internet, is an example of the digital mediating technology which role in education should not be viewed as add-ons, but has been largely viewed as an instructional tool for providing a richer and more exciting learning environment (Duffy & Cunningham 1996).

Cognitive tools, along with constructivist learning environments, guide and activate cognitive learning strategies and critical thinking (Jonassen, 1994). They can enhance the cognitive powers of learners during their thinking, problem-solving, and learning (Jonassen & Reeves, 1996). A student who uses a cognitive tool effectively should engage (actively), think (deeply), and articulate his/her knowledge (Jonassen, 2000).

It is clear that constructivist pedagogical principles coupled with appropriate technology integration show the potential for major improvements in teaching and learning practices (Živković, 2014). They together provide opportunity to make and remake the concept of ESP learning, and have brought new learning possibilities for teaching and learning situations. In other words, they can allow ESP learners to work to their fullest potential.

To sum up, the use of information and communication technologies in the constructivist learning environment is a current challenge (Živković, 2011) to rethink a number of educationalissues, such as students' autonomy, motivation, and creativity, as well as the enhancement of cognitive power. As Perkins (1991) observes, it is necessary to activate learners and to support the construction of meaningful new knowledge on the basis of the existing cognitive structures. Technologies are most successful when they are used to engage students in meaningful, relevant and authentic activities with open-ended software and the Internet (Jonassen, 2000). 'Mindtools' (Jonassen et al., 1996) promote independent and meaningful learning, support interactive, collaborative, and student-centered classrooms, and engage students in creative and critical thinking while constructing new knowledge.

Methodology

For the purpose of this study, a questionnaire method on students' attitudes towards the constructivist technology-supported classroom has been developed. The questionnaire includes motivation, creativity and innovation, autonomy, teamwork and collaboration in a context-based technology classroom.

Research Questions

The following questions were used to guide the study:

1. What are students' attitudes towards the

use of modern technologies in the classroom?
2. Do new technologies support motivation, autonomy, teamwork and collaboration, discussion, interaction and feedback?

Data Collection

The research was performed at the Faculty of Civil Engineering and Architecture in Niš, based on the sample of 85 undergraduate students. Data collection was done in the winter semester, 2015. Data analysis was carried out through the qualitative analysis technique. It has produced insightful results into students' perceptions of the constructivist learning environment as technologically oriented.

Results

The results on students' attitudes towards technologies in constructivist learning have shown that computer and the Internet support learning, improve students' motivation, enhance creativity, support innovation, increase autonomy, improve the collaborative process within teamwork, encourage discussion and develop technology skills.

Students' Perceptions regarding Motivation, Creativity and Innovation, Autonomy, Teamwork and Collaboration in the Digital Classroom

1. Motivation

- Students are highly interested and involved in activities on classes.
- They are encouraged by their teacher to activate in different ways (ideas, opinions,discussions).
- They are motivated to perform and succeed for the sake of accomplishing a specific result or outcome.
- They feel their work is recognized and valued, so they are more enthusiastic about learning.
- They are encouraged to debate and enrich the subject matter with visual aids (charts,diagrams, videos).

2. Creativity and Innovation

- Students are given a chance to promote creativity and innovation in the classroom.
- Students are able to connect things doing in the classroom with the outside world.
- They are allowed to explore different perspectives.
- They can display different ways of looking at problems.
- They are stimulated with new ideas for the development in organizational contexts.
- Students enhance skills of flexibility and the ability to use knowledge in different ways.

3. Autonomy

- Students are given autonomy in the classroom.
- They are totally responsible for all decisions concerned with their learning.
- They are able to take control of their own learning.
- Students are given the opportunity to make choice what is best idea for some project.
- They develop their own ideas for homework assignments related to what is being studied inclass.

4. Teamwork and collaborative learning

- It is a challenge to learn language in a collaborative learning setting.
- Students have the opportunity to practice sharing their experiences with their colleagues.
- They work together to search for solution, and thus, to accomplish shared goals.
- They can easily solve problems together with their colleagues.
- In teamwork they are able to organize their work effectively.
- They can share their ideas and discuss in the class.

5. The use of computers and the Internet

- Modern technologies are the best way to acquire and create new knowledge.
- They activate constructivist innovations in the modern world.

- Educational technologies contribute to the realization of active learning (student-centred learning).
- Their understanding towards using digital technology in the classroom is improved.
- They are used to foster autonomous and collaborative learning.
- They encourage students to take responsibility and control over their learning process.
- Technologies enhance the cognitive power of student (perception, memory, judgment, reasoning).
- Students are able to develop some applications of knowledge and skills.
- Apps can help create a learning environment that keeps students motivated and engaged.

Discussion

The research study has reported on the effectiveness of computers and the Internet technologies in the instructional environment. It presents a challenge to both students and the teacher.The challenge for the teacher is to provide a relevant framework for students upon which they construct knowledge and become active participants in the learning process (Piaget, 1968), and to modify learning activities to meet students' emerging needs (Black & Wiliam, 1998).

As far as students are concerned, they are encouraged to search for solutions to real-world problems, and thus, they are engaged in transformative learning which is essential for success in the 21st century.

What has become particularly evident is that technologies help build an extensive knowledge base, which will "engage the learners more and result in more meaningful and transferable knowledge… Learners function as designers using the technology as tools for analyzing the world, accessing information, interpreting and organizing their personal knowledge, and representing what they know to others" (Jonassen, 1994).

*C*ourses used a constructivist instructional methodology allow students to interact with learning materials, and to explore and construct vocabulary and meanings. The ultimate goal of today's students is to acquire the ability to successfully communicate with others (professionals) in a meaningful and appropriate way. As stated earlier, those courses prepare students to communicate effectively in real-life situations and cooperate with colleagues in professional fields.

It has been observed by Kim et al. (1999) that students in the constructivist learning environment have more positive attitudes towards learning as they share their experiences with their peers and the teacher, as well as they experience increasing discussions in the classroom. "Individuals make meaning in dialogues and activities about shared problems or tasks" (Helland, 2004).

Besides, Brown (1996) has proved that constructivist learning environment helps students to work collaboratively and makes it easier to focus on a specific area useful for future work.

Progressive education (Dewey's terminology) emphasizes the social aspect of learning and interaction with peers. Hence, Dewey proposes a method of "directed living", which means that students are engaged in an authentic, real-world context in which they can demonstrate their knowledge through collaboration and creativity. Therefore, we suggest engaging students into the digital learning environment that enables effective interaction and creates a rich collaborative learning experience. In such an environment, educational technology tools activate constructivist innovations which contribute to the realization of holistic, meaningful, purposeful, authentic, cooperative and problem-based learning.

All in all, students have a very positive attitude towards the use of modern technologies in the constructivist classroom (Kirkwood, 2000; Živković, 2014). In fact, they are highly positive in their beliefs about benefits and usefulness of computers and the Internet in the learning process.

Conclusion

The purpose of this paper is to show the importance of modern technologies in the

constructivist-orientedclassroom,highlighting the connection between constructivism and technologies. The focus is on the constructivist view of learning as an active process of constructing their own knowledge.

Constructivism asserts that learning is the active process of constructing rather than passively acquiring knowledge, and instruction is the process of supporting the knowledge constructed by the learners rather than the mere communication of knowledge (Duffy & Cunningham, 1996; Jonassen, 1999).

Constructivism provides a rich learning environment, and it represents the challenge for teachers, as well as for students to be engaged in meaningful performance tasks using digital technologies.

The utilization of modern technology in the constructivist learning environment enables students to be responsible and active in the learning process (Živković, 2013), which contributes to enhance learning outcomes.

The constructivist philosophy learning approach, together with the increasing influence of technological advancements in education, demand the use of meaningful authentic activities, to give the learning situation a purpose and meaning and, thus, to make the activity an example of situated cognition (Reeves et al., 2002).

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