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Developing constructivist learning environment to Enhance Online Courses

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Abstract

Developing an effective constructivist learning environment (hereinafter also referred to as CLE) for students is an essential task nowadays when on-line courses have become increasingly important in modern education and they will without any doubt become even more important in the future. But before start designing and developing CLEs it is necessary to have a clear, definitive idea of what CLEs are, or what they should look like. This study puts forward the idea of four levels of the constructivism methodological approach as a basis for developing any effective CLE: These levels are: 1. philosophical level of methodology; 2. general scientific methodology; 3. specific scientific methodology; and 4. technological methodology, which consists of research methods and techniques.

The authors first consider the fourth (lower) technological methodology level and give a description of methods and techniques which can be fruitful for developing CLEs to enhance online courses.

In this paper the researchers also draw out an initial draft of three fields of Digital Didactics (which is an old-new science which is being developed on the third level of the methodological approach and aimed to re-think the basis of Classical Didactics). These fields are a) teaching activities, b) learning activities and c) content and value aspects of education, all three presented through digitalisation of education in general.

Keywords: learning environment, online course, constructivist learning environments, methodology, level of constructivism methodological approach, digital didactics.

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Introduction

Developing a productive CLE for students at the time when online courses are in high-demand and might become even more popular soon seems an essential task nowadays. Traditional education with its paradigm of didactic instruction presupposes that students acquire information passively. Meanwhile, some educational specialists insist that another pedagogical approach which does not simply focus on information reproduction but is based on knowledge construction, should be employed more extensively by educators. They believe that this approach will make it possible to construct better educational software and will later result in more productive learning (Jonassen, 1994; Biggs, 1996; Brown et al 1989). They describe such a software as an ‘investigative original learning environment’ and stress that it is not just a storage of information but a tool which should guide students, help them gain transferable relevant knowledge and, consequently, achieve their desired learning outcomes. At the same time, the unfortunate events of the past three months when most schools and universities had to move online because of Covid-19 revealed that a great majority of existing online courses simply replicate traditional in-class learning courses thus losing plenty of educational opportunities that might be given by constructivist learning environments (Fowler, Armarego, & Allen, 2001; Connolly & Stansfield, 2007).

Purpose of the study

In a long-term perspective, the authors aim to design, develop and introduce a modern and progressive CLE for teaching business English in higher educational institutions. In this paper they make a first step to generate an illustration of exemplary model CLE. This study provides the idea of four levels of the constructivism methodological approach as a basis for developing any effective CLE: These levels of methodology are: 1. philosophical; 2. general scientific; 3. specific scientific; and 4. technological, which consists of research methods and techniques. The authors first consider the fourth technological methodology level to give a description of methods and techniques which can be fruitful for developing CLEs to enhance online courses. That also touches upon educational content, classroom online activities and asynchronous communication between members of university community.

In this paper the researchers also draw out an initial draft of three fields of Digital Didactics (an old-new science which is being developed on the third level of the methodological approach and is aimed to re-think the basis of Classical Didactics). These fields are a) teaching activities, b) learning activities and c) content and value aspects of education, all three presented through digitalisation of education in general.

Methodology

It is generally known that traditional education considers that the learner receives information passively. The so-called constructivist approach, acknowledged by philosophy, epistemology and pedagogics, focuses, on the other hand, on knowledge construction, not just simply reproduction of information students get from their teachers. This way better educational results might be achieved. Besides, such an experience will later help learners on their path of “life-long-learning”. But before we describe 4 levels of the constructivism methodological approach, let us first clear up the term "methodology" which is a significant and essential part of the science “Pedagogics” in Russia. Methodology is usually understood as the system of methods and principles used in a particular discipline or, in other words, the teaching about the organization of activities (Purgina, 2015). All human activities can be divided into reproductive and productive. At the same time, it should be noted that not all activities need a methodology. Productive activity is aimed at obtaining objectively or subjectively new results. Any research activity is always aimed at objectively new results. Teachers' or educators' innovative activity can be aimed at both objectively and subjectively new results. Therefore, in the case of productive activities, there is a need for its organization, i.e. the application of a certain methodology. It means that both modern theoretical research of education problems and practical pedagogical activity need some methodological basis (Novikov, 2006).

Pedagogic methodology researchers and academic specialists express different views on the notions of 'methodology in general' and 'pedagogic methodology'. Thus, Zagvyazinskiy defines pedagogic methodology as "the teaching about pedagogical knowledge and the process of its obtaining" and can be referred to as 'pedagogical cognition' (2006). Thus, pedagogic methodology includes:

- 1) teaching about the structure and function of pedagogical knowledge, including pedagogical problems;
- 2) initial, philosophical, key, fundamental, general scientific and pedagogical positions that have a methodological meaning;
- 3) teaching about pedagogical cognition methods (methodology in the narrow sense).

Here, the researchers go further and assert that pedagogic methodology now reflects not only general theoretical principles, approaches and methods of the theory of pedagogy, but also its practical application to the development and updating of the content. It means that pedagogic methodology is changing its nature and has already become the methodology of all educational activities and, above all, activities for the development, upgrading and transformation of the education system itself.

Combined efforts of pedagogic and education methodologies make it possible to correlate understanding and explanation of the essence and structure of human education, foresee directions of the education system development, design and organize the educational process.

The results of methodological problems analysis and understanding can be obtained within the framework of a certain methodological approach. The term "approach" is to be understood as the set of ideas, principles, various methods underlying problem solving. It can also be defined as a methodology for solving a certain problem that reveals the main idea, socio-economic, philosophical, psychological and pedagogical assumptions, principles, goals and their completion timeline. The methodological approach in education and pedagogy can be described as a set of methodically systematized principles of designing and organizing the educational process, which is formed on the basis of a system of knowledge about the patterns and laws of interaction of elements of the educational process, formed in relation to any quality or any side of human existence.

Here the authors agree with those researchers who state that such category as an approach is usually referred to during critical periods of a particular activity development and during the times of global changes (Vershina, 2008).

As for the methodological approach, it can be characterized as the one having the conceptual theoretical part and the technological part applied as a method and model for its implementation.

There is also a certain relationship between the terms 'method' and 'approach'. However, in contrast to the approach, the method characterizes the process of cognition in terms of determining the way of its implementation, the form of activity of the subject of cognition. The approach cannot be reduced to a method, it is a framework for both the method and the principle. When combined, they form a certain epistemological integrity.

The methodological approach can also be defined as "the principal methodological orientation of a research, the point of view from which the object under investigation is considered (the object determination method), the concept or the principle that guides the overall strategy of the research" (Yudin, 1978).

Thus, the concept of approach is usually associated with the target orientation and overall strategy of a scientific research.

The idea of the methodological approach can be supplemented by the idea of the levels of methodological knowledge introduced by Blauberger and Yudin who describe the methodological analysis as consisting of four levels (1973).

The content of the 1st, highest philosophical level of methodology, consists of the general principles of cognition and the categorical structure of science as a whole. The entire system of philosophical knowledge carries out crucial methodological functions.

The 2nd level is the level of general scientific methodology which frames a kind of abstract (theoretical) concept typical for most scientific disciplines.

The 3^d level is the level of specific scientific methodology, i.e. a whole complex of methods, research foundations and procedures which can be applied to a certain special scientific discipline. This particular science methodology consists of problems peculiar to scientific cognition in general, and questions put forward at higher levels of methodology, such as systematic approach issues or modeling in pedagogical research.

The 4th level is a technological methodology which consists of research methods and techniques, i.e. a whole complex of actions or certain measures that ensure reliable empirical material to be properly obtained primarily processed, after which it can be included in the store of scientific knowledge. Any methodological approach contains components of all four levels of methodological knowledge. Thus, the authors come to the conclusion that constructivism as a methodological approach also should contain four levels.

Practical Research

In this article the authors consider the fourth (lower) technological methodology level and give a description of methods and techniques which can be fruitful for developing CLEs to enhance online courses and online education in general. Online course in university education has recently become immensely popular, not to mention the fact that they turned out to become the only option to go on teaching in the times of quarantine restrictions. At the moment, researchers distinguish between various forms of online courses identifying Massive Open On line Courses (hereinafter also referred to as MOOCs), Open On line Educational Resources (also referred to as OOERs), Shared Open On line Courses (known as SOOCs). These resources are to some extent similar in structure and modes of their use. However, their target audience might differ: while MOOCs being mostly free (but for the verified certificate) have primarily been designed for use by a wide audience, including, of course, university students, SOOCs are mostly aimed at those already working but in need of further education in business or management

(Klimova & Kopus, 2019). Besides, massive open online courses available at such well-known educational learning platforms as Udacity, Coursera or EdX are mostly self-paced, while SOOCs are, as a rule, personalized and aimed at following individualized learning paths.

OOECs, in their turn, might serve as a substitute of commercial SOOCs. In those Russian higher educational institutions which have been using online courses for some years, OOECs are free for students, especially if they are an essential part of an academic plan and may be used as a credit-taking course led by university professors. They are usually designed for students studying a certain academic discipline and serve as an addition to traditional face-to-face classes.

The researchers gained considerable experience in using OOERs in their teaching while adopting the so called “flipped classroom” to hand over educational content. In previous papers they proved that a successfully flipped classroom involves more than just recording didactic content and sending it to students before a lesson (Lopukhova, Makeeva, & Rudneva, 2020). They also gave a description of didactic materials that can be downloaded into an online course (Lopukhova, Makeeva, & Zhuravleva, 2019). Thus, one of the elements of OOER is a lecture. Bligh (2000) characterizes a lecture as one of the oldest ways to supply students with information given by a certain educator (university professor) to an organized group of students for a defined period of time. Though this is a popular and effective means of providing students with educational information, it is no doubt less effective for other learning purposes as they are neither applicable for creating critical thinking nor effective for developing acquired skills or equipping students with hands-on experience (McKeachia et al 1990; Bligh, 2000; Exley & Dennick, 2009). At the same time, one should remember that lectures usually contain latest, up-to-date or even unique information thus sharing personal insights, etc (Exley & Dennick, 2009; Bligh, 2000).

Taking into consideration all these points we rethought the concept of lectures for their successful use in an online environment and formulated some advice for their further implementation:

1. Lectures should be made engaging and interactive.

Laurillard (2002) explains that the lecturer’s role in university teaching is to help students learn, and not simply to impart knowledge. Other scholars (e.g. Biggs & Tang, 2007) agree and stress that breaks or relaxation activities should be introduced by the lecturer at least three times in an hour as students’ attention declines and proves insufficient to concentrate on the content of the lecture. Possible activities to switch to are group discussions, mini quizzes, case studies, etc (Gibbs et al, 1992). Online recorded lectures, in their turn, should also be divided into 10-15-minute-long recordings to be interrupted by questions on students' knowledge acquisition, short quizzes or even funny pictures on the subject.

2. The class should be effectively supervised.

It is extremely challenging to properly manage and supervise a large group of students. They are often distracted, some are silent, the others talk too much. This often depends on the students' background (Brookfield & Preskill, 1999). Most commonly, students expect that their teacher would make things right and challenge disruptive behaviour (Exley & Dennick, 2009). It is really important for the teacher to intervene in situations like that to prove oneself a successful mediator and facilitator and set a proper example to the students (Appleby, 1990). It is also vital to stay calm, establish mutual respect and follow the rules you once imposed. The now popular method of jigsaw technique can also be implemented during lectures. It can serve as a means to bring the students together socially and help them collaborate thus finding unique solutions (Polat, Bukharkina, Moiseeva, & Petrov, 2009).

3. Sessions should be inclusive and comprehensive.

Most students' life experiences differ as they possess different cultural and academic backgrounds. It all influence their expectations and assumptions of education. Larger groups differ more considerably, and "the fewer values and beliefs shared by a group of people who gather to talk, the harder it is for them to understand one another" (Brookfield & Preskill, 1999). Still, this diversity could be used to the teachers' advantage and enriching teaching techniques and learning modes.

4. Session structure should be clear and organized logically.

University curricula and online courses content and structure should be based on constructive alignment (Biggs & Tang, 2007). Only so and in no other way teachers can establish a coherent framework for educational purposes and learning outcomes. All assignments and assessments should be integrated with this logical structure. Transparent structures and frequent signposting are also vital for keeping attention of all online participants and ensuring they follow updates and understand context (Exley & Dennick, 2009).

5. Visual aids and technology should be used relevantly.

When media are used well, audiences find the message more credible (Brown & Race, 2002). But audio-visual aids (AVs) can contribute to better understanding and promote the adoption of new materials only when implemented properly. Modern online AVs embrace such online developments as electronic presentations with the possibility to inset video-fragments (Google slides or Prezi), interactive communication boards (LinoIt, Padlet) simulations, online communication social platforms (Twitter, Facebook,) learning management systems of different types, online response systems which encourage

active learning: students answer questions (via their mobile devices, as a rule) and their anonymous answers are instantly shown on the screen (Bruff, 2009). Such activities usually lead to discussions and promote deep learning rather than the outdated 'covering content' approach (Fry, Ketteridge, & Marshall, 2009).

6. Mind and use a constructivist approach.

Theory of education once proved that students learnt best while acquiring knowledge and obtaining information actively often through social interaction (Vygotsky, 1986). Later evidence demonstrated that collective learning positively affects academic achievement and persistence (Springer et al, 1999). The term 'lecture' implicitly inhibits tutor innovation and active session design which, in their turn, are themselves the basis for the constructivist approach and its proper implementation.

Theoretical Research in Development

Developing constructivist learning environment to enhance online courses significantly affects educational content, classroom activities, communication between members of university community and other essential parts of modern educational process. This process also has effect on 3 fields of Digital Didactics (an old-new science which is developing on the third level of the methodology and re-thinking the basis of Classical Didactics) a) teaching activities, b) learning activities and c) content and value aspects of education. Digital Didactics is committed to facilitate both individual / personal and collaborative / joint learning. As defined in the frames of the constructivism approach, learning is new knowledge construction or, in other words, co-operative formation of knowledge that is "an active process of constructing rather than gaining knowledge" (Duffy et al, 1996). Most educators (Barr & Tagg, 1995) characterize this approach as a shift towards a progressive learner-centered approach which focuses on critical thinking skills and their development and is based on students' deeper understanding and further reflections on what they have learnt. The role of a teacher is here to show a way how to integrate opportunities for cognitive learning (Kember 1997). This process is also known as 'active learning' where students are not only "knowledge consumers" but are effective "information prosumers". This way of looking at didactics logically alters the general attitude towards teaching and learning thus making teaching a tool necessary to facilitate learning (Hauge & Dolonen, 2012; Selander & Kress, 2010). Thus, digital didactical design embraces: a) teaching activities, b) learning activities which help accomplish modern goals of education, and c) content and value aspects of education, what content and values of the modern culture students have to internalize to a culture-adopted person.

Thus, the challenge posed before educators is to rethink teaching and change teaching methods and principles to encourage deeper learning. That needs the constructive approach and Digital Didactics as the third level of the methodology to design new modes of learning in universities and other HEIs.

Conclusion

To sum it up the authors can conclude that constructivism is a modern approach which focuses on knowledge construction, not simple reproduction of information which students obtain from their teachers. This approach can successfully serve as a methodological ground to further create better educational environments and acquiring better learning. The research indicates some preliminary conclusions and show that the constructive approach and Digital Didactics can be used successfully for solving some problems of current university education. These problems lie in the fact that information nowadays can have many structures. It is not just simple texts existing as the only source of information in a university of the XX century. It is also a storage of dynamic information accumulated on the Internet and characterized by hypertext structure and features. Teachers may be of more kinds: from nationally or globally specialized lecturers to accessible learning supporters and supervisors, and to local mentors. Learning as a process is made visible. It belongs to the learner who has many tools and strategies to her/his use. Learning is learning, no matter what prefixes it has “distance”, “blended”, “mobile”, “non-formal”. The individual’s learning is more important than fitting into educational structures.

In this work the authors involved different methods and technologies, e.g. flipped classroom, interactive lectures, jigsaw technique, inclusive sessions, LMS-systems, etc., which present the fourth methodological level of the constructivism approach. Still, developing a constructivism learning environment still lacks the first philosophical level and the second scientific level of the constructivism approach which have yet to be described. Digital Didactics, in its turn, also requires further elaboration.

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