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TEAM LEARNING CONCEPTION IN THE DISTANCE EDUCATION SYSTEM

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Abstract

Currently, distance education has received additional impetus due to the long time enforced isolation caused by the COVID-19 pandemic and need to provide training sessions for the widest audience of students - from elementary school to bachelors, masters and graduate students in higher education. So, pedagogical community was pushed by the circumstances to look for new effective methods of educational process organizing in distance form. Ensure on the one hand, active students participation in educational process, making it more democratic, and on the other hand, not to lessen supervision over each student. The search, development and new forms implementation in distance education system are also necessary to provide comfortable social environment both for students and teachers. It is also necessary to ensure their active interaction in the studied topics and communication, not only during lectures and practical classes, but also outside school hours (during the teacher's absence). This opportunity provided to students, or such educational process features will encourages them actively communicate on the lecture course issues, will allow the students creative minds to unfold. One of the forms of distance educational process that allows realizing above mentioned opportunities is team learning.

Keywords: Distance education, team learning, engineering education

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1. Introduction

Distance engineering education appeared in the second half of the 20th century as additional tool for advanced training, new engineering specialty acquisition or as a means of relevant information and specific questions answers from highly qualified teaching specialists obtaining. At the same time, basically, this form of education was focused on people who already had the first special or higher education, and in addition, distance education was considered as secondary "forced" option of education, which had to be chosen by people who, for one or another reason (employment at work, remoteness, etc.) could not afford to visit the classrooms of the university for relatively long time. Many universities worked on distance education courses creation by developing special platforms allowing teachers to effectively structure and present their materials (Anderson & Dron, 2011; Palvia, 2013; Palvia et al., 2018). At the same time, great attention was paid to the teaching quality problems and level of mastering material. Creation of the systems required development and implementation of appropriate security systems, personalization of users and secure storage for personal data and their progress (Antokhina et al., 2020a). With the passing of time, the attitude towards the distance education system has changed, however, in most cases it still remains as an additional or "forced" form of education, when a student, for some reason, does not have the opportunity to take a full-time training course. The COVID-19 pandemic and the forced long-term isolation required a radical change in the attitude towards distance education (Fengchun et al., 2020; Report of UNESCO online Conference, 2021). This was a forced step, but it led to a significant surge of interest to this form of education, required development and implementation of new ideas and approaches that could significantly increase the effectiveness of this form of education and encourage students to actively use distance engineering education. One of these ideas is to bring the concept of team learning into the distance education system.

2. Problem Statement

Rapid and effective Internet services expansion, fourth and fifth generation wireless communications implementation and, accordingly, a significant increase in the number of audience using Internet information resources and availability to have access to a large amount of various information instantly brings task of the education system to a significantly transformation (Dziuban et al., 2016). In the beginning of the XXI century one of the essential tasks of educational institution and teacher was to provide the student with information, prompt answers to the student's questions about the subject being studied. Nowadays, in most cases, numerous Internet resources successfully cope with this task, and in many cases its use by students turns out to be even more efficient and convenient for the learner (Grishanova & Kapichnikova, 2020). In addition, the presence of a large number of well-structured Internet resources, illustrated, in many cases not only with drawings, graphs and photos, but also with dynamic plots and 3D models, becomes a significant competitor to the teacher (Bezzateev & Novikova, 2015). Speaking about full-time education system this problem may be not such a pressing issue at the moment, then in the distance learning system, when the teacher does not have the ability to control the student's actions during the lecture, the problem of "competition" and "verification" of the teacher's lecture material with information provided by Internet sources becomes especially sharp (Dyakova & Sechkareva, 2019).

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It should be noted that this is especially important in the field of engineering education, since modern technologies and breakthrough ideas in engineering evolve very quickly, respectively, information about new products appears on the Internet and the teacher is required to quickly track the appearance of such new products, otherwise his lectures may seem students are outdated, not relevant and students will prefer other information sources (Antokhina et al., 2020b). For the same reason, the material of lectures on modern advances in information technology, artificial intelligence, quantum technologies and other areas of engineering becomes outdated very quickly and the efforts and time spent by the teacher to create an electronic version of the course turn out to be completely unjustified (Mansurova, 2020). Considering the listed problems of engineering education, we can conclude that in the learning process, the main teacher's attention should be focused not so much on providing information to students as on explaining the essence of such information, analyzing the process of its appearance and possible directions for the further development of constructive and breakthrough ideas, as well as teaching students to use this information in solving specific engineering problems.

One of the possible and effective forms of described above education mode realization can be the found in so-called team learning conception. This is, the educational process in which not separate individuals isolated from each other are involved, but some groups of students - teams whose task is to comprehend and implement some idea / ideas in solving specific engineering problem proposed by the teacher.

3. Research Questions

The complex engineering problem solution naturally presupposes participation of several specialists in various narrow engineering specializations under the general guidance of a wide-profile specialist with sufficient experience in managing engineering projects. The task of this specialist (project manager) is to coordinate individual specialists' work, formulate the overall task of the project, maintain a comfortable creative atmosphere in the team and established work schedule for the whole team. The team creation is dictated by the current state of science and technology, when the narrow specialization of employees, associated with a large amount of knowledge and skills required in any narrow field of engineering science, leads to the fact that, starting from the end of the last century, it is almost impossible to imagine that one specialist could solve a complex multicomponent engineering problem.

Currently, almost any device we use in everyday life requires the solution of mechanical, electrical, materials science and many other problems, the effective solution of which depends on the stable and comfortable operation of device. It is obvious that the above-described team of specialists can be formed on a long-term basis, to solve multitude of similar engineering problems and on a temporary basis - to solve a one-time task. However, in both cases, effective tool for the successful work and existing problem solution is a right specialists – team members selections.

4. Purpose of the Study

Modern information technologies and existing telecommunication systems make it possible to assemble and organize the effective specialists team work using the Internet. Undoubtedly, remote mode

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of various specialists cooperation for complex engineering problem solution is far from being as effective as working in face-to-face - "live" communication mode. However, in some cases there is no other opportunity to gather a team of required highly qualified specialists in one project. Modern information communication technologies provide a large number of various service programs (such as Zoom, Discord, Skype, Microsoft Teams, etc.) that allow discussing and visually demonstrating technical documents and materials to team members, while recording the opinion of each team member, making operational corrections and additions to the current document (Vasilyev, 2020). Thus, distance learning not only allows the learner to transfer the knowledge and experience of the teacher, but also ensures that learners acquire Internet skills when discussing technical, abstract problems and issues. This approach to the distance education goals and objectives allows you to significantly expand the performed functions and possibly increase the student's motivation in mastering modern dialogue services provided by means of the Internet (Baltykov & Uchurova, 2019).

5. Research Methods

The main distance learning issues in the field of exact sciences are as follows:

- The teachers' inability reliably control the students' reaction to the presented educational material,
- The operational feedback complexity during the lecture,
- Lack of effective tools for conducting interactive parts of the lecture,
- Difficulties for teacher's control of active work (participation) of the student during the lecture.

The presence of these and other problems leads to a significant decrease of the distance learning effectiveness comparing to the traditional lecture form, significantly reduces the motivation for participation in such educational process for both students and teachers.

Team form distance learning application, when students preliminarily divided into teams, each team is asked to either independently choose some engineering issue related to the topic of the lecture course, or the issue is formulated by the teacher and then, during the lecture, each of the teams offers their solutions in an interactive form relying on the lecture material read, This mode, of course, significantly increases the efficiency of lectures and allows the teacher to more accurately control the process of assimilation of lecture material by students. In addition, this distance learning form allows you to create a certain society in the student community, since in the process of finding a solution to the proposed engineering issue, active communication of students within the team is assumed (Soroka, 2020).

5.1. Team building task

Without doubt, the correct choice of team members participating in the educational process is important factor ensuring the team form distance learning success. The team that chooses and solves engineering issue in the process of listening to the lecture course. The decision on the team formation should be made by the instructor, determining its quantitative composition and the necessary skills and basic

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knowledge of the team members. For example, you can give the minimum set of students and their initial knowledge (specialization) included in a team:

- Project Manager.
- Technologist.
- Information Technology Specialist.
- Specialist in charge of marketing.
- The specialist responsible for the patent purity of the developed idea.

Depending on the issue being solved, the composition of the team members can be expanded both in terms of the number of specialists (students) of a certain selected profile, and by adding specialists of a different profile (not indicated in the above example list). After completing the process of teams creation, each team receives from the teacher or independently comes up with, coordinated by the teacher, some urgent engineering issue, the topic related to the course being taught. Obviously, having this task, students will have to listen to lectures more attentively and interestedly, ask questions and strive to use the lecture material and the time allotted for questions and answers to obtain specific information that would help them in solving their engineering problem. Important element in this case is students' initialization for active interaction and discussion of the lecture material within their team using telecommunications and the Internet to search for possible ideas and solutions related to the topic of the assignment they received.

5.2. Distance teamwork toolkit

Distance team learning naturally implies the need for students to organize their work using new telecommunications and information technologies, using interactive Internet applications such as Zoom, Discord, Skype, Microsoft Teams, etc., and systems for joint storage and documents edition for discussion. Thus, in the remote teamwork process, students will not only acquire knowledge and skills in the corresponding lecture course, but also acquire skills in working with systems that provide joint distance work.

The experience of distance learning wide implementation and the restrictions caused by the COVID-19 pandemic has clearly shown that distance mode use requires to have strict working day plan, to schedule "meetings" on the Internet, to organize joint document flow, etc. both for students and for teachers (Shurukhina et al., 2020). Of course, complex engineering issues discussion by using the Internet resources is significantly inferior in efficiency face-to-face discussion with team members. However, the acquisition of the skills of distance project team work should apparently be considered as integral part of modern specialist-engineer training.

6. Findings

This paper discusses one of the concepts that can increase the efficiency and attractiveness for students and teachers of distance form of engineering education. The main approaches of the team form training organization, topical implementation problems and possible solution methods are proposed.

Possible ways of students team organizing and principles of their joint work are considered. The role of the teacher in the successful organization of team learning is discussed. Undoubtedly, the team form of distance education requires further improvement, optimization of the structure and work to increase its attractiveness and efficiency.

7. Conclusion

The team form of education considered in this work is not a new or revolutionary form, it has proven itself well in full-time education, demonstrating its effectiveness both for better assimilation of the material by students and for creating a favorable social environment during the educational process. Of course, this form direct transfer to distance education is not possible and will require additional efforts, making appropriate changes in the educational process, to the form of material providing and quality control system of material assimilation by students. However, the use of team form can significantly expand the audience of students and improve the quality of teaching.

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