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USE OF DISTANCE LEARNING TECHNOLOGY IN TEACHING ENGINEERING STUDENTS A FOREIGN LANGUAGE

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Abstract

The article deals with using distance technologies in teaching engineering students at higher educational institutions. In 2020-2021, the introduction of distance learning gained worldwide coverage in different spheres, including the higher education system, due to the spread of the coronavirus infection around the globe. The pandemic has forced the participants of the educational process to switch to distance learning. The teaching staff of our university, as well as many our colleagues around the world, had to master distance technologies on an urgent basis. Not everyone happened to be prepared technically and psychologically for such a drastic change in the educational process. It concerns both teachers and students. The authors have analyzed the benefits and drawbacks of this teaching technology during the pandemic using the example of their own electronic course in foreign languages. Having overcome the first challenges, we thought about increasing the effectiveness of distance learning and motivating our students to learn a foreign language in this format and conducted a survey among the engineering students of our university. As it happens, the majority of students reacted positively to the transition to distance learning. However, this type of training has its drawbacks that cannot be ignored. In this article, the authors share their experience of distance teaching. The article provides the analysis of the results of the survey of the students as well.

1.   Introduction

The education sector is always under the influence of the conditions in which the country and the world are at the moment. Higher education is no exception. It is obvious that the coronavirus pandemic has made its own changes and led educators to reconsider technologies being used in teaching various disciplines.

As practice shows, distance learning technologies have recently proven themselves to be quite effective in teaching foreign languages in higher education. Like many other specialists, the teaching staff of the Department of Foreign Languages for Engineering Students at Reshetnev Siberian State University of Science and Technologies have to switch from regular classes to distance learning.

The authors of the article have already touched on the issue of distant and hybrid teaching. But they dealt with Master Degree Students (Kurenkova et al., 2020a). In the current difficult epidemiological situation undergraduate students are being taught remotely as well.

The teachers of the Department of Foreign Languages for Engineering Students at Reshetnev Siberian State University of Science and Technologies try to use different approaches to make their classes more effective and attractive for students. For example, they have developed such activities as online role-playing games, wiki translation and online micro-conferences in a foreign language.

Using the distance learning technology in learning a foreign language has proved to be a very promising teaching tool for most of the academic courses created by the Department of Foreign Languages for Engineering Students. However, the common practice of foreign language teaching poses a series of peculiar requirements for a distance learning system which are difficult to meet.

2.   Problem Statement

The use of distance learning technology has acquired particular relevance in the context of the spread of the coronavirus infection in the world and in compliance with the self-isolation regime. In 2020 it goes without saying that almost every university had to switch to online education due to quarantine (Djalilova, 2020). A significant number of works by modern authors are devoted to the problems of distance learning. The authors of these works are trying to analyze benefits and drawbacks of distance learning and teaching (Artemova & Maltseva, 2011; Beketova & Katkova, 2010; Viktorova et al., 2011). Some authors devote their papers to distance teaching at higher educational institutions (Trajanovic et al., 2007; Yalova et al., 2016). However, at the moment the problem of distance learning hasn't been paid enough attention to be solved yet.

3.   Research Questions

The article raises the following research question:

- ▪ Will the use of distance learning make the teaching process more effective?
- ▪ Which online activities are more motivating for engineering students?

4. Purpose of the Study

The purpose of the study was to examine the attitude of the engineering students towards distance learning in general and a foreign language distance learning in particular, analyze the preferences of the students when choosing exercises for mastering language material. Based on the data obtained, the authors are planning to develop more effective and motivating activities taking into account students' preferences and interests, paying particular attention to the development of different types of exercises depending on the gender composition of the student groups.

5. Research Methods

At the present time, the skills and abilities of students to find necessary materials on the Web and use them in their educational and research activities are becoming more and more relevant. Thus, developing competencies related to the use of a foreign language and modern network technologies is useful, and the skills acquired during the training are in demand. In our opinion, the following advantages of distance learning can be distinguished: the possibility of a deeper mastering of a language due to the selection of assignments; a flexible training schedule that allows taking the course at a convenient time for students; the pace of the exercises is chosen by the students themselves; increasing motivation through gamification and socialization of the learning process; the design of the course allows using it from mobile devices (tablets and smartphones) as well (Kurenkova et al., 2020b).

On the other hand, in order for an e-learning system to be successful, there should be a variety of factors contributing to its success. The Internet infrastructure should be reliable to avoid communication failure. The e-learning system should be interactive and accessible all the time and easy to navigate. Besides, the content should be sufficient, clear, up to date, interactive and enjoyable. Instructors' teaching competence, personal characteristics, subject matter expertise and relationships with students are vital for e-learning courses as well. Therefore, before starting an online course, instructors should be trained about how to teach online, arouse learners' interest and maintain student attendance and participation. Moreover, instructors should be friendly, proficient, accessible and quick to respond to students' needs and concerns (Ozudogru & Hısmanoglu, 2016).

The most important component of the educational process at distance learning is the purposeful and controlled intensive independent work of a student. At present, at Reshetnev Siberian State University of Science and Technologies, an online assessment of students' knowledge is usually carried out in the form of testing, discussion in the forum and webinars. There is a practice of using video lectures.

We have used the qualitative research method to analyze data while preparing this paper. Qualitative research is not associated with measurements and therefore does not employ statistical instruments. It focuses more on a group's experience than on statistics or numbers. To achieve the proposed objective, we have used the literature of different scholars and researchers providing data collection through the in-depth study of concepts and opinions (Oliveira et al., 2018). The chosen methodological procedure was the case study of distance education. This exploratory case study was aimed at analyzing how effective distance education can be compared to other traditional forms of education. The main objective is to facilitate a

wider search in this area. The stage of data collection can be considered as a preliminary investigation constituting an essential method in conducting the research.

5.1. Theoretical background

Specialists from different countries are dealing with the issue of distance learning. For example, Gajek and Michońska-Stadnik (2017) write that scientists have been researching and analyzing the use of information and communication technologies in teaching and learning languages for about 70 years. In addition to the development of the theoretical aspect of research in this area, the practical approach is being developed as well. Over time and as technical capacity develops, researchers and teachers test and evaluate the method of working with digital materials and tools. Scientists formulate two main research goals. One includes psycholinguistic research in language processing, such as teaching reading while using an online dictionary, or studying language acquisition by measuring reaction times in grammar exercises. This goal includes the study of strategies for monitoring mistakes corrected after dictation. The second goal relates to the learning environment. For example, an effective strategy that relieves tension is supported by virtual tools such as applause and emoticons that enhance language experience by expressing and sharing emotion. When students use digital tools to learn foreign languages, software and students' strategic creativity are key components. The student's level of autonomy when working with digital tools depends on the type of tools and strategies built into the software.

Distance learning gives students more freedom and independence. Students draw on their own experiences using new materials and digital assets and come up with personalized learning strategies. Thus, the use of a strategy is derived from the learning context (Huang, 2016).

Students accustomed to the assessment and independent choice of material from the Internet for learning a foreign language can effectively control their own strategies for learning foreign languages in a digital environment in their free time (Gajek & Michońska-Stadnik, 2017).

Felix (2001) believes that the effectiveness of distance learning depends on the gender and age of students. The study of the interconnection between the use of digital learning strategies and the gender or age of the student shows that older students (over 30) prefer using web content as a supplement to their curriculum, but spend more time learning in a digital environment. In the same study, men spent more time studying online content than women and were more likely to use digital content during classroom studies. The researcher notes that students enjoy language contact outside formal education, i.e. via the Internet: they read texts, watch films, play computer games and communicate with foreigners through the digital environment.

Some specialists are sure that information technologies will definitely make educational process more attractive for students. For example, Basińska (2017) considers that ICT contributes to individual work of students offering each student an appropriate level of difficulty. With the same tool at their disposal, each student will complete the task to the best of their ability. ICT teaches through play. Students do not feel like they are learning, but they are having fun. ICT allows students to control the learning process. Students receive immediate feedback if they make a mistake. They can repeat the assignment at any time, watch a film again, etc. ICT increases initiative and creativity and allows students to collaborate with other learners on an assignment. This collaboration is sometimes remote.

However, some authors do not agree that distance learning can replace classroom studies. It is possible that the proportion of distance learning will increase, but it still seems utopian to say that at some point in the history of education, classroom teaching will become obsolete and thus be completely replaced by distance education. For future studies, it is suggested to do a survey through questionnaires applied to students of distance education to enable them to assess and expose their judgment on the process (Oliveira et al., 2018).

5.2. The engineering students' survey conducted at Reshetnev Siberian State University of Science & Technology

To implement the objectives of the study, we used the results of a students' survey conducted in order to determine the opinion on the use of information technology as a means of improving the learning process. We concentrated our efforts on a target group of engineering students, whose technical background knowledge enabled them to easily master new software tools and technologies.

The authors conducted the survey among the engineering students of Reshetnev Siberian State University of Science and Technology in December 2020. The survey involved 150 students from different institutes of the university: Institute of Informatics and Telecommunications, Institute of Space Technology, Institute of Engineering and Economics, Institute of Civil Aviation and Institute of Mechanical Engineering and Mechatronics.

Taking into account the specifics of the university and the areas of training, it should be noted that a greater number of students are male students (about 80%). Gender specification is important because the arguments of students of different genders differ significantly.

The respondents were asked to identify their attitude towards distance learning denoting its advantages and disadvantages that are of concern to them. The examination of this information is important because the authors hope it will give the opportunity to find the ways to successfully integrate the process of teaching a foreign language into a modern environment.

The students note the following positive aspects of distance learning: more free time, possibility to study even in case of illness, safety, possibility to study anywhere, mobility; individual approach, possibility to study at your own pace, it is easier to get good grades, etc.

The respondents note the disadvantages of distance learning as well. They are the following: it is difficult to understand the material (information is not fully digested), technical problems, lack of face-to-face communication, eyestrain, array of information, problems with self-discipline, some topics are difficult to study on your own, etc.

In order to increase the motivation of our students in the future, we also decided to find out which language activities they prefer. In the course of the analysis, we came to the conclusion that the preferences of the students are determined by the gender factor. Therefore, we present the results for the male (see Table 1) and female (see Table 2) students separately.

Table 1. Male students prefer

Task type	5 points	4 points	3 points	2 points	1 point	0 points
Match a word in English with its definition in English	47.4%	15.8%	36.8%	-	-	-
Put the words in the text	52.6%	15.8%	26.3%	5.3%	-	-
Translate the sentences into English	47.4%	26.3%	21 %	5.3%	-	-
Match the words from the first column with the words from the second column	52.6%	31.6%	15.8%	-	-	-
Give a presentation	52.6%	10.5%	15.8%	-	15.8%	5.3%
Do a crossword puzzle	47.4%	10.5%	21 %	10.5%	5.3%	5.3%

Table 2. Female students prefer

Task type	5 points	4 points	3 points	2 points	1 point	0 points
Match a word in English with its definition in English	80%	20%	-	-	-	-
Put the words in the text	80%	-	-	-	-	20%
Translate the sentences into English	100%	-	-	-	-	-
Match the words from the first column with the words from the second column	80%	-	20%	-	-	-
Give a presentation	80%	-	-	-	-	20%

As we can see, there is a significant discrepancy in preferences between the male and female students. The male students prefer more creative assignments that challenge their ambition. The female students prefer activities, which require perseverance, thoroughness and patience.

The only assignment, on which the opinion of both male and female students coincided, was "to match the English words from the first column with the English words from the second column". If we take the survey participants of both genders as 100%, we will get the following results shown in Table 3.

Table 3. Both male and female students prefer

Task type	5 points	4 points	3 points	2 points	1 point	0 points
Match the words from the first column with the words from the second column	58.4%	25%	16.6%	-	-	-

We also analyzed what types of assignments the students do not like. We present the results in Tables 4 and 5.

Table 4. Male students like least

Task type	5 points	4 points	3 points	2 points	1 point	0 points
Tasks related to finding information and data on the Internet	21%	26.3%	15.8%	21%	-	15.8%
Fill in financial or other tables	5.3%	31.6%	31.6%	15.8%	5.3%	10.5%
Write an essay	10.5%	26.3%	26.3%	-	21 %	15.8%
Learn a topic	5.3%	26.3%	36.8%	-	21 %	10.5%
Make the plan of a text	10.5%	31.6%	31.6%	10.5%	5.3%	10.5%
Write a business plan	15.8%	5.3%	42.1 %	15.8%	-	21 %
Watch the video and ask questions in English	21 %	15.8%	21 %	15.8%	15.8%	10.5%

Table 5. Female students like least

Task type	5 points	4 points	3 points	2 points	1 point	0 points
Watch the video and write main ideas in English	20%	-	60%	-	-	20%
Watch the video and summarize it in English	20%	-	40%	20%	-	20%
Watch the video and ask questions in English	-	-	60 %	20%	20%	-
Fill in financial or other tables	-	-	20 %	20 %	20 %	40%
Write a business plan	-	-	20%	40%	-	40 %

As we can see, the male students do not like the assignments that are time-consuming and require the application of mental effort. The female students find it most difficult to do the assignments related to videos and different spreadsheets. We can conclude that there are only three types of activities that both female and male students do not like equally. They are shown in Table 6.

Table 6. Both male and female students like least

Task type	5 points	4 points	3 points	2 points	1 point	0 points
Watch the video and summarize it in English	16.7%	12.5%	29.2%	16.7%	16.7%	8.2%
Fill in financial or other tables	4.2%	25%	29.2%	16.7%	8.2%	16.7%
Write a business plan	12.5%	4.2%	37.5%	20.8%	-	25%

The second part of the questionnaire dealt with the difficulties and problems that students had during distance learning. 55 % were quite satisfied with the work of the server. However, the rest of the respondents encountered some difficulties: 1) sometimes the site did not work; 2) there were problems with registration on the server; 3) the work of the server is not optimized; 4) system reboot was required; 5) it was not easy to find the right course. As we can see, the students had mainly technical problems connected with the work of the server.

6. Findings

The experience of our team shows that many students prefer distance learning to traditional, as it saves money, time and it is safer psychologically and with regard to health. However, we discovered a number of the problems that the students encountered during distance learning. All the problems can be divided mainly into technical (problems with equipment and communication), psychological (there is no psychological preparation for working with technical devices, slow adaptation), mental (problems with perception, digestion of information), physiological (sedentary lifestyle , problems with eyesight and back, health in general).

In our opinion, the main advantage of distance learning is the fact that it involves a greater number of students, which would not be able to happen in the classroom. From the students' point of view, the main advantage is the flexibility offered by the distance courses. Students also have the opportunity to develop activities in their own time, when they want or can do it. The teaching staff of our department believes that distance education has its advantages, but it is definitely less effective than classroom education.

During our research we got to know which types of activities our students prefer and which of them they do not like. Taking the results of our study into account, we are going to develop three sets of exercises suitable for our learners. The first set is for the groups that have mostly female students. The second one is for the groups that have mostly male students. The third one is for the groups that have approximately the same number of students of both genders.

7. Conclusion

Modern network technologies are changing social life in general and the learning process in particular. People spend more and more time online, and the transfer of the educational process to an online environment opens up new opportunities for both students and teachers. The use of modern network technologies is a challenge that we must face in order to successfully integrate the educational process into a modern environment.

Nowadays, teachers from different countries opt for blended learning, which is a combination of distance and classroom learning (Jeffrey et al., 2014). We consider that blended learning is an optimal solution. Taking into account the results of the students' survey, it can be concluded that despite a number of shortcomings of distance learning, most of the students do not reject it; they prefer combination of classes in a traditional classroom with a distance learning format. Distance learning is especially popular among postgraduates and other students who have to study late. The teachers of our university are also of the opinion that the optimal teaching is teaching using distance technologies, but at the same time, classroom work must be present. Distance learning cannot completely replace classroom instruction. However, in rare situations, this type of training is the only possible one. University staff should always be ready to switch to remote teaching in case of emergency.

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