



Distance learning impact on the English language teaching during COVID-19

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Abstract

These days, distance learning has almost completely replaced traditional teaching methods due to the COVID-19 pandemic and the introduction of quarantine measures. A sharp rise in interest in distance learning methodology has raised a number of new questions and challenges. This research examines changes in the training process and cognitive abilities and academic performance during the coronavirus pandemic. Students of the I.M. Sechenov University and Al Ain University were surveyed (103) during classroom and distance English learning before and during the COVID-19. Three samples of the average values of the respondents' self-assessment of academic performance, cognitive abilities (namely concentration and memory), progress in performing oral assignments, progress in performing written assignments, ability to absorb information while reading and by ear; general health condition during the training and were obtained and tested for the Gaussian distribution law compliance. All of the rates studied fell during distance learning during a pandemic compared to distance learning outside a pandemic. However, it should be noted that they still turned out to be higher than the marks obtained in classroom teaching. Students were interviewed for possible factors influencing the reviewed teaching modes effectiveness (the survey showed that these factors are an increase in the amount of leisure time, ability to take breaks more often, more comfortable learning environment, no need to spend time on the road to the university).

Keywords Classroom learning · COVID-19 · Distance learning · English · Pandemic

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1 Introduction

With the development of advanced technologies and the Internet, distance learning is becoming more and more widespread, partially putting classroom education on the back burner. A vast amount of research on related topics provides evidence that the interest in distance education, which has become an international trend, is steadily increasing. However, it should be noted that recently there has been a tendency to lose interest in this problem among scholars, as evidenced by the small number of articles on this topic over the past 10 years. Nevertheless, in the article Allen and Seaman (2010) it was noticed that, there are no prerequisites to assume that this training method will lose its popularity. With the emergence of the global pandemic caused by the COVID-19 viruses, almost all educational institutions have switched to distance education, which has returned interest in this learning method. A vast amount of research on related topics provides evidence that the interest in distance education, which has become an international trend, is steadily increasing (Dron & Anderson, 2016). Now, there are no prerequisites to assume that this training method will lose its popularity (Allen & Seaman, 2010). Due to the development of special web environment that supports advanced educational practices, many conceptual changes in the modern education system were noticed (Arkorful & Abaidoo, 2015).

Given the general accessibility of modern technologies and their enormous impact on everyday human life, present-day society has stepped into the next stage of distance learning development (Andryukhina et al., 2020; Dorozhkin & Chernoskutova, 2020; Cherkasov et al., 2015). Distance learning is characterised by high training efficiency and data availability as well as steady information transfer speed, regardless of the user's geographical location (Romanov, 2019). Anderson and Dron (2011) designate three types of distance education pedagogy, namely, cognitive-behaviourist, socio-constructivist and connectivist. They denote that it is necessary to apply all the mentioned approaches to achieve the maximum effectiveness of distance training.

Pulker and Kukulska-Hulme (2020) have explored the reuse and adaptation of open educational resources during teaching foreign languages (including English) and their impact on educational practice. Based on data obtained during the survey of teachers, researchers have built a five-step model for reusing open educational resources (Pulker & Kukulska-Hulme, 2020). It is known that most students admit that the lack of communication with the teacher to be the main difficulty in the distance study of English. Moreover, distance learning of English turned out to be more complicated than the traditional one (Zhang & Cui, 2010). Recent developments in learning technologies have shown excellent results and improved results for online learning, even in areas that were difficult to control online (Marcum & Kim, 2020). However, it should be remarked that experienced students usually have a lower level of anxiety and disappointment during classes than those who do not have sufficient practice with distance training technologies.

Distance education significantly affects the concept of learning as well as methods of obtaining information and its assimilation. Liu (2011) has revealed

that the student's gender and the classroom type do not play any role in the training process, while learning motivation, personal status in the class, and the teacher's academic title are considered fundamental. It is necessary to point out that many studies present a comparative analysis of the effectiveness of distance and classroom education. Nevertheless, the research results vary significantly. Some authors draw conclusions about the fantastic potential of distance education, while other researchers indicate a very weak and sometimes practically zero effectiveness of distance learning. For example, Tucker (2000) has carried out a comparative analysis of several groups of students engaged in both distance and in-class training and revealed insignificant differences between their learning outcomes. On the other hand, the study presented by Krämer et al. (2015) provides an argument that the effectiveness of distance education increases with time. Such findings may be provoked by the rapid development of modern technologies and widely available technical support. Bender et al. (2004) have noticed that distance learning requires much less time than face-to-face education. Though, if the one will count the time spent by the teaching staff on each student individually, the distance method of conducting classes will appear to be more time-demanding than the traditional one.

This article presents a statistical analysis of the students' survey results to confirm the hypothesis about the effectiveness of distance education compared to in-class learning mode and optimize the educational process in future. Within the present research, the main factors affecting the success of distance learning are introduced. Furthermore, changes in the distance education trends during the 2020 coronavirus pandemic (COVID-19) are investigated.

2 Methodology

2.1 Research design and sample

In the course of this examination, a survey was conducted among 103 students from the I.M. Sechenov First Moscow State Medical University (Russia) and Al Ain University (United Arab Emirates), who studied English in classroom and distance learning formats. Alongside, in connection with the coronavirus pandemic, one more survey was carried out among respondents involved in distance English learning to find the difference between the obtained results. All study participants belong to the same age category (from 20 to 23 years). The students' gender and social status were not taken into account since these factors presumably have a weak effect on the study outcomes.

The initial selection of respondents included 200 non-native English-speaking students of the Department of general medicine of the considered educational institutions. This selection was based on the participants' academic performance, so that only individuals with 'Very good,' 'Good,' and 'Satisfactory' marks in English (according to the European marking system) were enrolled. Such a choice was provoked by the intention of gaining a more uniform sample. Moreover, it may be explained by the assumption that the academic achievements of students with marks

'Excellent' and 'Fail' will not significantly change depending on the classes type and will create a heterogeneous sample. The second stage of respondents' selection was performed by the English teachers of the educational institution in the form of tests to confirm students' command of English. Consequently, 60 students were eliminated in the first stage, and 37 students in the second.

2.2 Experiment

The survey (see Appendix) was performed in three stages. At the first stage, the students were asked to fill out the questionnaire after 21 days of face-to-face education by completing the corresponding online form (before the introduction of quarantine). Following this, for 21 days, all the surveyed were transferred to distance learning mode and required to fill out the same form again by the end of the course. In this case, we are talking about distance learning in a terminologically accurate meaning, because the experiment involved university students who were forced to study outside the campus, the training did not necessarily take place using electronic devices, but under the regular supervision of a teacher according to a pre-arranged schedule (Allen & Seaman, 2010; Simonson et al., 2019). After all these manipulations, students were supposed to return to traditional in-class learning; however, in connection with the coronavirus pandemic, they continued studying online. Under such circumstances, study participants were asked to re-fill the online form for the third time, 21 days after the start of distance learning and the introduction of quarantine measures. English classes were held twice a week; thus, the online form was filled after every eight lessons. It should be underlined that the dates of the final surveys differ slightly depending on the university since the time of the quarantine introduction in Russia and in the United Arab Emirates vary.

Within the survey, respondents were required to evaluate the following parameters on a ten-point scale.

The parameters were followed:

- (1) Academic performance;
- (2) Concentration;
- (3) Memory;
- (4) Progress in performing oral assignments;
- (5) Progress in performing written assignments;
- (6) Ability to absorb information while reading and by ear;
- (7) General health condition during the training;
- (8) Mental condition during the training.

2.3 Data analysis

Within the research, a statistical analysis of the survey results was carried out (see Appendix) to confirm or refute the hypothesis about the increase of the effectiveness of learning foreign languages (in particular, English) via distance training mode. Moreover, the study outlined the impact of the COVID-19

pandemic on student performance, physical health, and mental wellbeing. Apart from this, after the survey, students were interviewed to identify factors that could significantly affect the obtained results.

In the course of the examination, three samples were obtained. They consisted of positive rational numbers, which were the arithmetic average of each respondent's estimates. These samples were checked for compliance with the Gaussian distribution law using the Shapiro-Wilk test since it was a prerequisite for their further analysis using the Student's *t* test, aimed at confirming or disproving the study hypothesis.

2.4 Research limitations

The reliability of this work can be improved by expanding the size of the studied samples through the introduction of new questions in the interviewing methodology. These actions are directly related to an increase in the accuracy of the Shapiro-Wilk test and Student's *t* test results. Besides, to obtain more objective outcomes, the research population can also be increased (Yap & Sim, 2011).

The processed results were based on the respondents' subjective assessment of their success in learning English as well as indirect indicators of performance (cognitive abilities, mental and physical condition). The students' performance indicators during distance learning can be significantly affected by the lack of proper teacher control (Hranovska, 2020). Thus, for a more objective evaluation of academic performance, respondents' knowledge should be checked via specially compiled tests on the covered material under tight monitoring conditions.

The learning outcomes can largely depend on the teacher's ability to control the learning process. In the conditions of face-to-face learning, it is more difficult for a student to cheat or take a hint from classmates, while during a distance lesson, the teacher cannot fully control the process of writing tests (Watson & Sottile, 2010). Besides, electronic writing tasks can be easily copied if they are not individual (Kocdar et al., 2018).

It also should be noted that the results obtained are based on the self-estimation of students of the studied characteristics, which can to some extent reduce the reliability of the results.

2.5 Ethical issues

Participation in the research was voluntary and anonymous. No personal data of students (including their names and university) was disclosed. All respondents agreed on the processing and publication of the survey results and were informed about the possible change in their performance level depending on the type of training. The authors of this research did not intervene in the learning process, but only analysed the survey outcomes.

3 Results

The study provides a comparative analysis of the results of the survey presented in the Experiment section. Table 1 displays the arithmetic mean of the respondents' answers, divided into three subgroups that correspond to in-class learning, distance learning before the quarantine introduction, and distance learning during the COVID-19 pandemic. The first column gives the numbers of questions from one to eight.

As can be seen, the assessments connected with distance learning before the pandemic are the highest (the third column), while the estimates related to face-to-face education (second column) are the lowest. This trend indirectly indicates the effectiveness of distance education compared to classroom learning. During the interview, the respondents distinguished the following factors that can significantly affect the improvement of physical and mental health during the study process, as well as students' cognitive abilities and academic performance:

- (1) Increase in the amount of leisure time;
- (2) Ability to take breaks more often;
- (3) More comfortable learning environment;
- (4) No need to spend time on the road to the university.

It should also be noted that, along with the factors noted by students, improved results can also be associated with:

- (5) Absence of harsh control from the teacher;

In addition to classroom and distance learning, this study also examined the results of the survey conducted during the coronavirus pandemic (the third column). It was found that the average students' assessments during COVID-19 quarantine were significantly lower than before its introduction. This fact may be associated with the increased anxiety of respondents against the lack of the usual daily routine, real-life communication, as well as a possible deterioration in the financial situation. Despite the difficult

Table 1 Survey results

No.	In-class learning	Distance learning	Learning during COVID-19
1	6.52	8.2	6.89
2	4.11	7.32	5.16
3	5.12	8.56	5.48
4	6.35	7.89	6.14
5	4.56	7.51	6.31
6	5.26	6.98	5.88
7	5.15	7.61	6.12
8	6.12	8.02	5.78

circumstances that arose from the coronavirus pandemic, distance learning still shows sufficient effectiveness.

Nevertheless, it is important to understand that the results obtained indicate only a particular correlation. Thus, the improvement of students' physical and mental health, as well as their cognitive abilities, can be perceived as a subjective assessment of respondents, and an increase in their academic performance may be caused by less strict knowledge control.

Table 2 presents the results of the examination whether the obtained samples comply with the normal distribution law using the Shapiro-Wilk test, found according to the following formula:

$$W = \frac{1}{s^2} \left(\sum_{i=1}^n a_{n-i+1} (x_{n-i+1} - x_i) \right)^2 \tag{1}$$

where n is the sample size ($n=8$), and i is the data element in sorted order.

The sample variance s^2 was calculated by the formula $s^2 = \sum_{i=1}^n (x_i - X_{av})^2$, where X_{av} is the arithmetic average.

The Shapiro-Wilk test depends solely on the sample size and its significance level. In this study, the significance level (the possibility of error) equalled 0.05, as for any data that were obtained experimentally. Consequently, the critical value of W statistic for the Shapiro-Wilk test was found by the following formula:

$$W_{cr} = \frac{-0,0113n^4 + 1,656n^3 - 91,88n^2 + 2408,6n + 67608}{100000} \tag{2}$$

The first column of Table 2 introduces the names of the groups to which the tested samples belong. As can be seen from the table, the Shapiro-Wilk test values for all three samples are below the tabular; therefore, they comply with the normal distribution law and can be analysed through the Student's t test.

Table 3 shows the results of examining the study hypothesis through the independent two-sample t -test. Its outcomes were also compared with the results of the survey conducted during the COVID-19 pandemic. The corresponding calculations were made by the following formula:

$$t = \frac{\bar{X}_i - \bar{X}_j}{\sqrt{\frac{s_i^2 + s_j^2}{n}}} \tag{3}$$

Table 2 Results of testing samples using the Shapiro-Wilk test

Sample	Shapiro-Wilk test			
	X_{av}	s^2	W	W_{cr}
In-class learning	5.40	5.205	0.0025	0.8180
Distance learning	7.76	1.805	0.0546	
Learning during COVID-19	5.97	1.954	0.0427	

Table 3 The Results of testing the hypothesis using the student's T test

Compared samples	Student's t test	
	t	t _{cr}
"1–2"	8.836	2.365
"2–3"	7.553	
"3–1"	2.351	

where $\bar{X}_i - \bar{X}_j$ is the difference in the average algebraic values of the samples X from the corresponding groups i and j ($i, j = 1, 2, 3$), n is the sample size, s_i^2 and s_j^2 are the variances of the samples.

The research hypothesis was tested by analysing the differences between the samples. Thus, if the empirical t-test value appeared to be higher than the critical, then the results in one sample were higher than in the other. Therefore, by finding the sample with the best values, the study hypothesis could be confirmed if the students' academic achievements during distance education were better than in the case of in-class learning. If the empirical t-test value would be less than critical, the null hypothesis about the absence of differences between the distance and in-class training could be accepted.

Table 3 exposes the results of the verification of three pairs of samples, where the line '1–2' refers to the subgroups 'In-class learning' and 'Distance learning'; '2–3' relates to 'Distance learning' and 'Learning during COVID-19'; and '3–1' is connected with 'Learning during COVID-19' and 'In-class learning.' The second and third columns display the empirical and critical values of the Student's t test. The corresponding calculations allowed the conclusion that the alternative hypothesis was confirmed for samples '1–2' and '2–3,' while the null hypothesis was validated for the pair '3–1'.

Based on the presented information, the conclusion can be made that distance learning and face-to-face education differ in their effectiveness. Since the average questionnaire estimates were higher for the 'Distance learning' subgroup (Table 1), the alternative hypothesis about the higher effectiveness of studying English online compared to traditional learning model was confirmed. Given the data in Table 3, it was also deduced that the effectiveness of distance learning during the quarantine dropped significantly and was almost the same as of the traditional classes. However, despite the absence of notable changes in the assessments of the subgroups 'In-class learning' and 'Learning during COVID-19,' student performance in the second subgroups was slightly higher (see question No. 1).

4 Discussion

The concept of distance education has been studied for a long time (Dumford & Miller, 2018; Machynska & Dzikovska, 2020; Simonson et al., 2019). However, it requires a more detailed examination under the current conditions connected with the COVID-19 pandemic.

The results of the study we presented overlap with similar studies over a long period of time. Shanley et al. (2004) have conducted an analysis of the results obtained by two groups of students enrolled in traditional classroom learning and distance education via CD-ROM and the Internet using SPSS. Taking into account the application of older and less convenient technologies, in the course of this study based on pre- and post-test, researchers have found no difference between the learning outcomes except the fact that distance learning appeared to be more time-demanding. The studies of distance learning, and especially e-learning, from different periods cannot be considered comparable due to the rapid development of technologies and in this case, there is no mutual basis for comparison. Closer to the presented study results were obtained in analysis by Pei and Wu (2019) for medical students. These early research findings on the comparative effectiveness of online learning are particularly interesting compared to more recent studies because their findings differ from ours. Obviously, the rapidly increasing efficiency of online learning can be influenced by two factors: the focus of education on the development of this particular segment and the entry into the field of education of generations of native digitals (Hromalik & Koszalka, 2018).

The latter review article provides an argument that the effectiveness of distance education is almost zero. Although this work, like the previous one (Shanley et al., 2004), analyses somewhat outdated methods for conducting distance learning. The development of online education is directly related to a significant leap in technological growth and the wide availability of the Internet and personal computers and educational methods oriented exactly on online learning (Sun & Chen, 2016). For this reason, the authors of the present study consider it more appropriate to compare their findings with newer works that examine the effectiveness of distance education in the modern world. Accordingly, taking into consideration a more recent study, attention should be paid to a systematical approach of Sibirskaya et al. (2019), who have outlined that today's remote training may be much more effective than the traditional one. The key factors that can provoke such outcomes are a comfortable learning environment, and a lesser amount of time spent on learning, which is consistent with the findings of the current research. Thus, the results obtained in the course of this study are consistent with the conclusions of the present study.

Distance learning is a source of unusual challenges, both technological and pedagogical. Bolliger and Inan (2012) have explored a wide range of challenges that distance education poses. In particular, through the online survey in Turkish universities using reliability analysis, the necessity of face-to-face contact and opportunities to interact and collaborate were analysed. The search for the newest information on this matter allowed revealing that less isolated participants are more emotionally stable (Tichavsky et al., 2015). Besides, students with a stronger involvement in the process of interacting with other learners are motivated better and feel more satisfied with the training. The isolation of students during distance learning at the present stage is easily solved by the familiar environment of social networks and other means of electronic communication. Now a lot of attention is paid to the techniques of online collaboration of students while performing joint educational and research tasks (Courtney & Wilhoite-Mathews, 2015; Cherney et al., 2018). This may explain

the results of the presented study, in particular, the decrease in the effectiveness of online learning.

In the study on student views of effective online teaching in higher education, researchers have focused on the importance of partnerships between learners to achieve a high level of cooperation (Courtney & Wilhoite-Mathews, 2015). However, they believe that this factor can carry both positive and negative consequences. In addition to increasing student motivation and meeting communication needs, creating partnerships can lead to negative self-assessment of one's success and opportunities, owing to the constant comparison of personal achievements with those of other students. In the practice of online learning, this problem has a solution in the teacher's regulation of students' access to each other's materials and in the regulation of the teacher's participation in the communication process (Pulker & Kukulska-Hulme, 2020; Tichavsky et al., 2015).

Another important issue in distance learning is student performance. Hromalik and Koszalka (2018) have revealed that student performance during distance English learning is directly related to personal ways of regulating the education process. This approach clarifies the possible interpretation of the results obtained in our study. The authors have unveiled a correlation between the methods of students' self-regulation and their level of oral English proficiency. Online learning forms more widely allow for the use of individualization of learning paths (Shen et al., 2020). Fernández-Toro and Furnborough (2018) have called upon the misalignment of necessary and provided feedbacks during distance learning of foreign languages using self-reported data and feedback analysis. The decrease in the effectiveness of online learning recorded by the results of our study may be associated with the nature of the teacher's work, monitoring the progress of students, their motivation, involvement and feedback. Two parallel surveys involving educators and their students have revealed that tutors often cannot evaluate the level of feedback needed during the study. Several researchers based on survey methodology also claim about the existence of the correlation between the phonological attainment and foreign language anxiety in distance language learning (in particular, English and French) (Bosmans & Hurd, 2016).

5 Conclusions

In the framework of the study, an alternative hypothesis about the higher effectiveness of distance English learning compared to traditional in-class education was confirmed after the survey of 103 respondents from the I.M. Sechenov First Moscow State Medical University and Al Ain University. Though, as a consequence of a complicated situation developed in the context of the global coronavirus pandemic, one more survey of the same group of respondents was conducted to examine the students' learning productivity during the quarantine.

Better effectiveness of distance English learning compared to traditional face-to-face education was confirmed by the calculations of the Student's *t* test. The average value of all evaluated indicators during the in-class training was 5.40, whereas their average estimate during the distance education comprised 7.76. While analysing this

variance through the Student's t test, a significant difference between the effectiveness of distance and classroom education in favour of the first was noted. Notwithstanding this, the average survey results for distance training during the COVID-19 pandemic (5.97) showed that the effectiveness of distance study has fallen almost to the level of in-class education. Despite the absence of a notable distinction between the results of distance learning during the pandemic and classroom training, when examining the corresponding samples with the Student's t test, the average value for distance learning during COVID-19 appeared to be somewhat higher than for the classroom one.

Along with this, the study respondents were interviewed in order to find the central factors that may positively influence academic performance during distance learning. Thus, according to the collected answers, they include an increase in leisure time, the opportunity to take more breaks during the training, more comfortable conditions for learning, and absence of the need to spend time on the road to the university. In the course of the investigation, possible reasons for the increase in the quality of distance learning of English compared to face-to-face education were also outlined. Among them are the absence of harsh teacher's control and the fact that students have fewer opportunities to compare their academic results with classmates' learning outcomes. Such events may contribute to the improvement of student's self-esteem and, as a consequence, eliminate the possibility of poor educational achievements.

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Data availability Data will be available on request.

Declarations

Conflict of interests Authors declare that they have no conflict of interests.

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