

A Comparison of Distance and Face-To-Face Learning of Science and Humanities Subjects from the Perspective of Military University Students

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Abstract

This article examines the assessment of teaching of selected science and humanities undergraduate courses, some of which were taught remotely and others in person. In a questionnaire survey students compared face-to-face and distance learning of the subjects. The data were statistically processed using descriptive statistics, Mantel-Haenszel test of linear association, Pearson chi-square goodness-of-fit test, and finally cluster analysis. According to the opinion of most students, distance learning was comparable to face-to-face learning. When the respondents were divided into clusters, two comparable groups emerged—one preferring face-to-face learning, the other preferring distance learning. Humanities subjects showed to be less time-consuming and yielding better final grades for the students.

KEY WORDS: *military education, distance teaching, hybrid teaching, humanities and science subjects, questionnaire surveys, cluster analysis*

Citation: Říhová, D.; Sedlačík, M.; Hasilová, K. A Comparison of Distance and Face-To-Face Learning of Science and Humanities Subjects from the Perspective of Military University Students. In *Proceedings of the Challenges to National Defence in Contemporary Geopolitical Situation*, Brno, Czech Republic, 7-10 September 2026. ISSN 2538-8959, <https://doi.org/10.47459/cndcgs.2026.128>

1. Introduction

As the use of artificial intelligence grows, the importance of distance learning is increasing. For the purpose of comparing distance learning and traditional education, the selected science and humanities undergraduate courses at the Faculty of Military Leadership of the University of Defence in the Czech Republic were taught exclusively online, mainly in a synchronous online format via MS Teams environment, while other selected subjects were taught only in the traditional face-to-face manner. In a questionnaire survey students compared face-to-face and distance learning of subjects focused on science (mathematics and statistics), and humanities (English language, military subjects).

The authors were interested in how students coped with these two types of teaching. They wanted to find out what the differences are between face-to-face and distance learning in science and humanities subjects. The aim was also to identify which elements of distance learning had proven successful and could be used in a possible hybrid education.

A specific feature and at the same time a limitation of our study is that we focused only on a military institution of higher education, where the majority of students are men (approximately 85%), and the variety of assessed humanities and science subjects is not wide.

In the following part of this paper, we will focus particularly on works that address similar issues related to online learning in mathematics and the humanities. According to Lu and Lemonde [26], the efficiency of online teaching is similar to the classical face-to-face teaching regarding the test scores achievement; however, it holds only for students with test results above the median. The results of the experiment conducted by Coates et al. [12] in economics courses (same syllabus, two different modes of presentation) show that students attending the face-to-face sessions outperformed those attending the online sessions in terms of test scores. Krishnan [24] focused on the teaching of mathematics, investigating how students perceived the on-site and online sessions in a mathematics course taught in a hybrid mode. It was found that students preferred on-site learning, as they were able to communicate face-to-face with classmates and the teacher, and better understand mathematical problems. Paul and Jefferson [28] posed research questions to investigate the differences between online and

face-to-face teaching, taking into account student performance, gender and class rank. They did not confirm any differences based on gender, class rank or in general.

Buchanan and Palmer's [9] findings related to a history course indicate that students were less satisfied with the online course compared to the face-to-face course, but their academic performance was comparable to the face-to-face course. The authors suggest ways of incorporating proven elements of the online course into a blended approach. In their study, Geçer and Dağ [17] stated that mathematics students were comfortable with blended learning because it encouraged them to engage in other activities in the course and helped them keep track of study materials, homework assignments, and other activities. The findings of Bergeler and Read [5] showed that the performance of the physics course for non-physics majors was comparable in both the online and face-to-face approaches. Students' learning outcomes and their perception of the course were the same, but online students were more satisfied. The benefits and difficulties of online courses are explored by Bettinger and Loeb [6], whose study, based on a fairly large sample of students, discusses both positive and negative aspects of this learning mode.

A study by Charkova and Somova [11] focused on a group of students taking an online English language course and investigated the dependence between the students' opinions regarding the effectiveness of the course and students' preferred form of learning. Their findings showed that there was a strong link between them. Students who were comfortable with distance learning valued the benefit of the online course more than those who favoured face-to-face learning. Lin [25] aimed to find out in which teaching mode (online or face-to-face) business students achieved a greater level of knowledge in a statistics course. It turned out that learning experience is the same, but the contentment was better in the on-site framework. In a study by Jiang and Jiang [22], online teaching of the mathematical methodology course was found to be effective. Most of the respondents preferred a combination of the two teaching modes and supported a communication with the teacher in person in the classroom.

A comparative study by Brashear [7] focused on mathematics courses for college English majors and investigated the effect of four different teaching methods, including online and face-to-face teaching. A significant difference was found in students' grades: the higher the percentage of online teaching, the better the grades. The article by Huang et al. [20] analyzed data on students' experience with online distance teaching of English as a foreign language. In contrast to previously mentioned studies, their study found that online learning provided more opportunities for students to communicate with their teachers and classmates.

Zehra and Abbasi [33], after an emergency shift from the on-site to the fully online mode of teaching mathematics, proposed to incorporate the hybrid teaching mode into the mathematics courses. Specifically, they recommended a scenario where the face-to-face teaching occupied seventy percent and the online learning tools took up thirty percent of the course length, arguing that in such a proportion of teaching and learning students would remain connected with their teachers. The results revealed that students' performance in the monitored mathematics course and in subsequent exams improved. Thurm et al. [32] used a questionnaire study targeted at mathematics subjects to assess the students' and teachers' experiences with the change from the face-to-face to online teaching. They found out that students were satisfied with the quality of distance teaching, however preferred regular face-to-face classes.

The results published by Haider and Al-Salman [18], who focused on comparing the perspectives of science and humanities, reported that humanities lecturers were more satisfied with the efficiency of the evaluation methods used in online courses than those teaching science subjects. Online humanities courses appeared to provide a learning environment that is more interactive than online science courses. Almahasees et al. [3] showed that online teaching is less effective than face-to-face teaching, although it is useful. Students reported that they missed the interaction with their classmates, had technical problems with the connection, and their motivation is lower than in face-to-face classes. However, self-study, convenience, flexibility, and low cost were reported as the main benefits.

The importance of online learning tools as perceived by students during the lockdown is discussed in Budur [8]. According to the questionnaire survey it was found that students were more or less satisfied with online learning, including lectures and exams, nevertheless they preferred short videos delivered through a friendly platform. The results obtained by Ferri et al. [15] revealed that participants in the online teaching and learning process encountered difficulties in technological, pedagogical and social areas. Based on the forum discussion, the authors pointed out the unreliable internet connection, the lack of suitable electronic devices, the digital skills of both teachers and students, the interactivity of lessons for the learners; and finally, the social issues related to the low human interaction between students and teachers. A questionnaire study conducted at a University Dental Teaching Hospital by Bawane et al. [4] reported that a quarter of teachers encountered network issues and considered it to be the main difficulty. Similarly, student participants saw connectivity issues as the most common difficulty as well. The majority of lecturers preferred on-site teaching to online teaching, and a large proportion of students were uncomfortable with online learning methods. Likewise, the study by Hsu and Ho [19] conducted at nursing schools came to a conclusion that although the online teaching being more flexible it could not fully replace the face-to-face teaching. The questionnaire results reported technical problems with network connection and computer equipment, poor effectiveness in teaching practical skills and a lack of the social interaction between students, teacher and also patients.

A paper written by Cavanaugh et al. [10] examined students' perceptions of how the COVID-19 pandemic changed their opinions about the quality and difficulty of courses that were categorized by academic discipline (mathematics, science, engineering, humanities, and social sciences). A statistically significant decline in perceived course difficulty and quality was observed, but these decreases were largely general, regardless of the specific field of study. The benefits and disadvantages of online learning were explored by Jayara [21], who focused on medical education. Last but not least, Flores et al. [16]

assessed college students' adjustment to online learning, summarizing both positive and negative experiences with the online teaching mode.

Finally, let us mention the specific work by Sedlačík et al. [30], which deal with the analysis of science and humanities subjects in military environment, and the article Říhová et al. [29], which compares online education in certain subjects at civilian and military universities.

2. Data and Methods

Mathematical Methods, English Language, and Military History were selected as subjects which had been taught in distance mode. Subsequently, Probability and Statistics, War Studies, and English Language were selected as subjects which had been for the purpose of the intended comparison taught in-person. These subjects represent the main types of subjects that students encounter at the beginning of their studies at the University of Defence. The aforementioned subjects may be described as humanities—namely as general subjects (English Language) and military subjects (Military History, and War Studies), and subjects related to natural sciences (Mathematical Methods, and Probability and Statistics).

In order to collect data, a questionnaire was created in Google Forms. It consisted of 40 questions, which helped the participants assess their experience with distance learning, compare it to in-person courses, assess the time burden, assess how they handled the topics and assignments, cooperation with teachers, indicate which type of courses suited them better, and which forms of teaching and activities their teachers had used. The respondents also assessed advantages and disadvantages of distance learning. The initial questions were more general; further on, the questions were targeted at individual learning subjects. Most questions were close-ended, and used the 5-point Likert scale for evaluation. The first ten questions are listed in Table 1. Subsequent questions assessed the time burden, supply of study materials, cooperation with teachers, course quality, and the final grade obtained in individual learning subjects. The final question was open-ended, and participants used it in order to express their opinions and thoughts about distance learning. The questionnaire was sent to second-year students and exactly 100 respondents took part in the survey.

Table 1.
Initial questions in the questionnaire.

Question No.	Question Formulation
1.	Assess your experience with distance learning at the University of Defence.
2.	Assess distance learning in comparison to face-to-face learning.
3.	Compare the time burden that distance learning presents in comparison to face-to-face learning.
4.	Assess how you managed to deal with distance learning.
5.	You mostly worked on the assignments and tasks (independently; with the help of your classmates; with your family; with your teacher; with a tutor).
6.	Assess the level of cooperation with your teachers.
7.	Assess the advantages of distance learning. a) The comfort of home; b) time efficiency; c) flexibility; d) no need to commute; e) reduced costs; f) anonymity; g) easy cooperation and cheating in examinations; h) quantity of study materials.
8.	Assess the disadvantages of distance learning. a) Inadequate understanding of the covered topics; b) weaker concentration; c) low motivation; d) necessity to organize one's studies; e) more self-study; f) little communication with teachers; g) limited social contact; h) technical problems.
9.	Which learning mode would suit your needs the best? (Online mode only; predominantly online mode; I do not have a preference; predominantly in-person mode; in-person mode only)
10.	Which forms of teaching and activities did your lecturers use during online teaching? (Written materials, lecture presentations, texts for seminars, online lectures and seminars, their video recordings, pre-recorded videos, online consultations, e-mailing, other options).

In order to get a basic overview of the data, methods of descriptive statistics were applied. Given the nature of the data and the frequency distribution of individual responses, we used the Mantel-Haenszel test of linear association between the variables representing face-to-face and distance learning within the individual categories. The statistics follows Pearson chi-square distribution with one degree of freedom. Furthermore, in order to test whether the differences between the individual subjects occurred simply by chance or whether a significant difference played a role, we used the Pearson chi-square goodness-of-fit test

Subsequently, the objects were classified using cluster analysis, which respects the multidimensional character of the obtained data set. Cluster analysis sorts the basic set of objects into several relatively homogeneous clusters

3. Results

First, let us look at a comparison of face-to-face and online learning, its advantages and disadvantages. Based on the responses the students provided in the questionnaire, it follows that 73% of the respondents classify distance learning at the Faculty of Military Leadership as good and, on average, assess it as comparable to face-to-face learning, which is presented in the following graph in Figure 1.

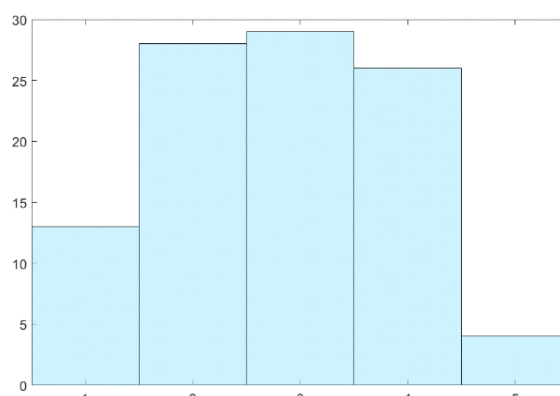


Fig. 1. Assessment of distance learning compared to face-to-face learning (1 = significantly better; 2 = predominantly better; 3 = comparable; 4 = predominantly worse; 5 = significantly worse).

Furthermore, 50% of students prefer distance learning to face-to-face courses, 16% are indifferent about their learning mode, and 34% prefer face-to-face courses. The vast majority of respondents (90%) reported that in comparison to face-to-face courses, distance learning was less time-consuming. Exactly 60% of students managed to handle distance learning independently without any problems, and 37% of students with some help from others, especially from their classmates. For 81% of respondents, the level of cooperation with their teachers was good in this learning mode. As far as the forms of teaching and activities are concerned, online lectures and seminars along with their video recordings were used most frequently; these were held in a synchronous mode. Furthermore, students were provided with lecture presentations, and could communicate with their instructors during online consultation hours and via e-mail.

The left side of Table 2 below shows average values of the observed advantages of distance learning, which were assessed using the 5-point Likert scale. Students see time efficiency as the most significant benefit. Another significant benefit associated with this fact was that students did not need to commute to school. This also corresponds to the low variability of responses to these questions. Among other major benefits, there is the comfort and peace of home, flexibility, a good quantity of supplied study materials including the recordings, and reduced costs. The variability of responses to these questions was higher. The remaining benefits, such as easier cheating in examinations, and anonymity of the environment are perceived by students as an advantage, but they are not considered important.

Table 2.
Average values of benefits (left) and disadvantages (right) of distance learning.

Benefits	Mean	Std. Deviation	Disadvantages	Mean	Std. Deviation
Time Efficiency	4.59	0.683	Limited Social Contact	3.68	1.399
No Need to Commute	4.33	0.985	Technical Problems	3.19	1.237
The Comfort of Home	4.07	1.217	Lower Concentration	3.04	1.414
Flexibility	4.06	1.023	Inadequate Understanding of the Covered Topics	2.71	1.217
A Sufficient Amount of Study Materials (Video Recordings)	3.97	1.159	Low Motivation	2.51	1.314
Reduced Costs	3.80	1.407	Little Communication with Teachers	2.35	1.086
Easy Cheating in Examinations	2.94	1.254	More Self-Study	2.04	1.100
Anonymity	2.55	1.209	The Need to Organize One's Studies	1.69	0.961

Notes: Benefits (1 = not a benefit; 2 = a small benefit; 3 = an adequate benefit; 4 = a major benefit; 5 = a significant benefit); Disadvantages (1 = not a disadvantage; 2 = a slight disadvantage; 3 = a fairly important disadvantage; 4 = a major disadvantage; 5 = a significant disadvantage).

Similarly, average values of the assessed disadvantages of distance learning are listed on the right side of Table 2. Students perceived limited social contact with their classmates as the most fundamental disadvantage. This result was absolutely expected. Another significant drawback was technical issues with Internet connection, and problems related to working on a computer. Other disadvantages are related to lower concentration, inadequate understanding of the subject matter, and low motivation for studying. On the other hand, students did not see the need to organize their studies independently as a disadvantage or as a significant aspect. It is necessary to point out a slightly higher variability in responses to questions regarding the disadvantages of distance education, which is probably related to a greater differentiation in their perception. This fact will be considered in clustering, which will be commented on in the section dealing with cluster analysis results.

When comparing the individual indicators of selected subjects (time burden, provision of study materials, cooperation with teachers, quality of teaching, and final grade) within the subject groups (language, military, and mathematics subjects), a significant difference between face-to-face (F2F) and distance learning was found only in cooperation with teachers of military subjects ($M^2 = 3.218$, $p = 0.07283$), and slight differences were also found in cooperation with teachers of mathematics subjects ($M^2 = 3.769$, $p = 0.05222$), and in the quality of teaching of mathematics subjects ($M^2 = 0.3471$, $p = 0.5558$). Note: The test was created in such a way that if there is a linear relationship between the individual learning modes (that is, we reject the null hypothesis of a zero correlations coefficient), then both types of learning modes are comparable. But if we do not reject the hypothesis, it shows the differences between face-to-face and distance learning.

The comparison of individual subjects showed that there was a significant difference in the amount of time students had devoted to the subject (dist. $\chi^2 = 84.61$, $p < 0.001$, F2F $\chi^2 = 60.88$, $p < 0.001$), as well as in the final grade obtained (dist. $\chi^2 = 60.55$, $p < 0.001$, F2F $\chi^2 = 63.62$, $p < 0.001$), both in face-to-face and distance forms of learning. The left side of the following Table 3 contains the percentage of respondents who assessed the time burden of the individual subjects in aggregate for both learning modes. When compared to humanities, science subjects were found to be substantially more time-consuming. The right side of the Table 3 represents the percentage of students' final grades in individual subjects, again in both learning modes. The assessment of English Language is missing, since students' learning was not measured using grades in this course. Apparently, students scored better in these humanities subjects. On the other hand, the quality of teaching, availability of materials, and cooperation with teachers did not differ between subjects in either face-to-face or distance form of teaching.

Table 3.
Distribution of respondents' assessment of time burden (left) and of student's final grades (right).

Time Burden	Reduced (%)	Average (%)	Increased (%)	Grade	A (%)	B (%)	C (%)	D (%)	E (%)	F (%)
English Language	53.5	35.0	11.5	English Language	-	-	-	-	-	-
Mathematics Subjects	9.5	40.0	50.5	Mathematics Subjects	18.5	22.0	26.0	19.5	12.0	2.0
Military Subjects	31.5	36.0	32.5	Military Subjects	46.5	20.5	20.5	9.5	2.5	0.5

Now we will examine the result of cluster analysis when dividing the data into two homogenous groups. The values of the responses to the first nine questions were chosen as the variables for creating the clusters, which assessed distance learning in relation to face-to-face teaching from several aspects (experience, comparison of time burden, how students mastered the topics, methods of solving tasks, cooperation with teachers, specific benefits and disadvantages of distance learning, preference of the type of teaching). The division of data into clusters based on responses to these questions is shown in the following graph; see Figure 2. Cluster 1 contains 50 cases, and Cluster 2 contains 50 cases.

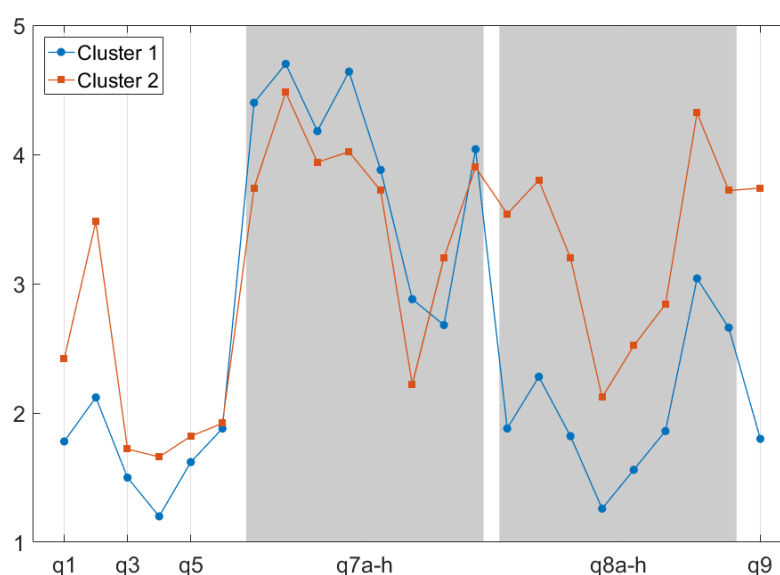


Fig. 2. Plot of means of each cluster based on responses to selected questions.

As the displayed curves show, the respondent division into clusters is primarily determined by their responses to the following four questions—which type of teaching suits the student best (Question 9 in the graph), assessment of distance learning compared to face-to-face learning (Question 2); but especially the assessment of the disadvantages (Questions 8a-h) and benefits of distance learning (Questions 7a-h), which have a grey background in Fig. 2. The centers of the clusters differ most significantly in case of the preferred mode of learning. If students were to choose the learning mode that would

suit them better, Cluster 1 would choose distance learning 82% of the time, while Cluster 2 would choose face-to-face learning 68% of the time, as shown in the following graph in Figure 3.

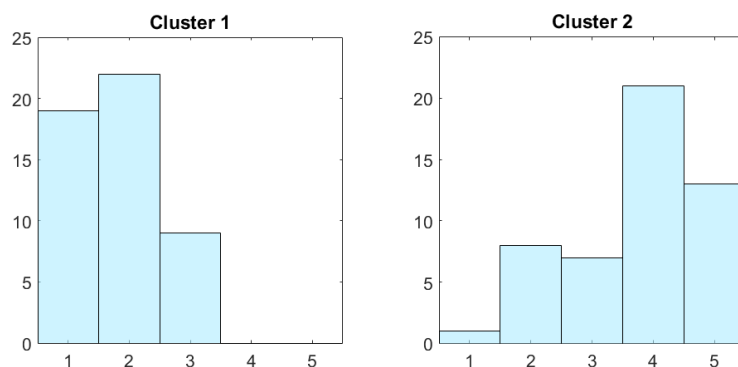


Fig. 3. Division of the preferred learning mode into clusters

Notes: 1 = online mode only; 2 = predominantly online mode; 3 = I do not have a preference; 4 = predominantly in-person mode; 5 = in-person mode only.

That means that Cluster 1 tends to prefer the online learning mode, whereas Cluster 2 finds in-person courses more suitable. There is also a big difference in the comparison of the two forms of learning, with Cluster 1 classifying distance learning as the better option in 68% of all cases, while 54% of respondents belonging to Cluster 2 classify it as worse. As far as the benefits of distance learning are concerned, the cluster centers are close and almost similar regarding the amount of learning materials provided, the perception of reduced costs and time efficiency, and flexibility; however, the cluster centers are significantly different when assessing the disadvantages. Nonetheless, there is a consensus that Cluster 1 respondents assess all the observed disadvantages as less significant. Apart from limited social contact and technical problems, they see disadvantages of distance learning merely as small. On the contrary, Cluster 2 members perceive the listed disadvantages as more fundamental, and often rate them as fairly important or even major disadvantages. This was the case mainly for inadequate understanding of the covered topics, and lower concentration. Cluster 2 members were also discontented with the limited social contact, which was the most significant disadvantage for them, and they were similarly strongly worried about technical problems.

On that account, Cluster 1 can be interpreted as students who prefer distance learning, and do not mind its disadvantages as much. Further on, this cluster will be called the Distance Cluster. Cluster 2 consists of students who prefer face-to-face learning, and the disadvantages of distance learning are more troublesome for them; in the following sections of this paper, we will refer to this cluster as the Face-to-Face Cluster. Both clusters are of the same size; the students are thus divided exactly into two halves. Respondents belonging to the Face-to-Face Cluster have a lower ability to focus and keep up to distance learning, have issues with inadequate understanding of the covered topics, and also lack intrinsic motivation to study. They need to interact with teachers to a greater extent, and ask questions during classes, so they are more comfortable with traditional means of face-to-face teaching, such as working at the whiteboard, etc. They also lack closer contact with classmates, and are more stressed by technical requirements of distance learning. For this reason, face-to-face learning mode suits them better, and they consider distance learning to be the worse option. In case of the Distance Cluster, the situation is the opposite. In the final open-ended question intended for comments and opinions about distance learning, respondents in both clusters rated it very positively, primarily because of the time efficiency, and they appreciated the distance form of lectures, which were simultaneously recorded, giving them the opportunity to watch these multiple times. Respondents from the Face-to-Face Cluster recommended the seminars to be held mainly in the in-person form. Let us present a student's opinion: "I find distance learning much better from a financial point of view and also when considering organizing one's time schedule. Nevertheless, it is more demanding when it comes to mastering the topics. The most significant benefit is the option to replay lecture recordings again."

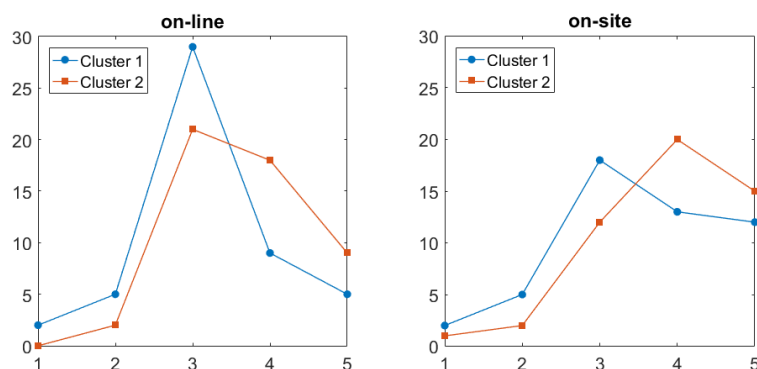


Fig. 4. Time burden imposed by mathematics subjects.

Notes: 1 = very low; 2 = rather low; 3 = average; 4 = rather high; 5 = very high for Distance (blue) and Face-to-Face (orange) Clusters.

Within the subject groups, the two clusters do not differ with respect to the individual indicators (time burden, provision of study materials, cooperation with teachers, quality of teaching, and final grade). However, when it comes to individual subjects, there are noticeable differences between the clusters. The levels of time burden represented by mathematics subjects differ for distance and face-to-face learning clusters; see Figure 4. The graphs show that the Face-to-Face Cluster reports greater time burden both during distance and face-to-face teaching.

For the purpose of a comparison, division into three homogenous groups was also applied, where the same clustering variables were chosen. Cluster 1 contains 37 cases, Cluster 2 contains 39 cases, and Cluster 3 contains 24 cases. The result of cluster analysis, i.e. division into three clusters based on responses to Questions 1–9 is presented in the graph in Figure 5.

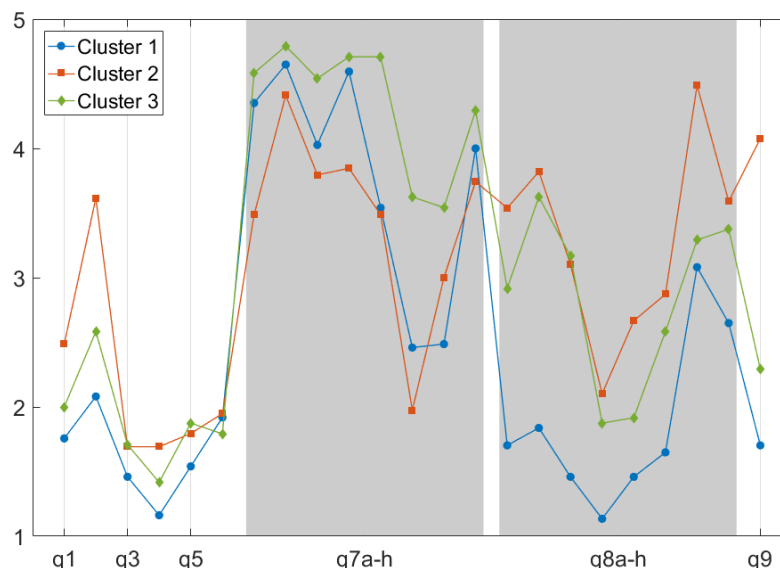


Fig. 5. Division into three clusters based on responses to selected questions.

The plotted curves show that the Distance (Cluster 1) and Face-to-Face (Cluster 2) clusters remain essentially the same, and the division of respondents into clusters is based mainly on rating of responses to the same questions as in the case of the two clusters. As far as Cluster 3 is concerned, its centers differ most significantly when assessing the benefits and disadvantages of distance learning. Centers connected with the benefits lie higher than the other two clusters, thus the respondents belonging to Cluster 3 value the benefits of distance learning more than the others; they classify these benefits as major or significant. These benefits are, above all, anonymity, reduced costs, and easier cheating in examinations. On the contrary, the centers of disadvantages lie between the centers of the remaining clusters, but are close to the centers of the Face-to-Face Cluster. On that account, Cluster 3 perceives the disadvantages almost as strongly as the Face-to-Face Cluster; only the need for more self-study, and limited contact with classmates bother its members less. Regarding the preferred method of teaching, Cluster 3 finds distance learning more favourable, but not as strongly as the Distance Cluster. To sum it up, Cluster 3 can be seen as students who are comfortable with distance learning mainly because of its benefits, but at the same time strongly perceive its disadvantages. This cluster can be described as an Ambivalent Cluster. If we divide the participants into three clusters, the Distance Cluster encompasses 37%, the Face-to-Face Cluster encompasses 39%, and the Ambivalent Cluster encompasses 24% of the respondents. The figure presented above clearly shows that Face-to-Face and Distance Clusters have approximately the same numerical distribution as when the participants get divided only in two clusters, while the Ambivalent Cluster is the smallest one.

4. Discussion

As opposed to other research papers whose authors compare online to face-to-face teaching of the same subjects based on students' opinions, or investigated the correlation of students' final grades in these two learning modes, authors of this paper focused on the comparison of different science and humanities subjects taught in both modes. The main result of our research was the finding that in general, distance learning was well accepted by students, and rated as comparable to face-to-face learning. A surprising conclusion was that a larger proportion of students (50%) preferred online learning mode, while a smaller proportion of students (34%) preferred face-to-face teaching. Given the fact that the participants were students at the beginning of their university studies, it might have been expected that a larger percentage of them would prefer face-to-face learning mode. Similarly, in Budur [8], 40% of students were comfortable with online live learning sessions, and more than 50% were not, although they did not reject it completely. Charkova and Somova [11] obtained the opposite ratio in their study, where the number of students who preferred distance learning was significantly lower than the number of students

who preferred face-to-face courses. In Bawane et al. [4], as many as 82% of students were not in favour of the online learning mode. As for teaching and learning of mathematics, according to Krishnan [24], students prefer traditional in-person courses.

According to the students' assessment, the most significant benefits of online learning include time efficiency, no need to commute, the convenience and flexibility it brings, which is quite consistent with the findings published by Almahasees et al. [3], and by Hsu and Ho [19]. In Dvořáková et al. [14], 25% of students said that the flexibility and time management seemed to be beneficial elements of online education. In their study of university students' satisfaction with online learning, Cole et al. [13] cited convenience as the most common reason for satisfaction and lack of interaction as the most common reason for dissatisfaction. On the other hand, similarly to Ferri [15] and Huang et al. [20], students perceived limited social contact as the most significant disadvantage of the distance learning mode. Dvořáková et al. [14] claimed that more than 80% of students lacked mutual communication with peers and teachers and opportunities for group collaboration and discussion. Another disadvantage mentioned by students was technical problems, which they had found highly stressful. These factors were also listed in Almahases et al. [3], Ferri et al. [15], Bawane [4] and Hsu and Ho [19]. Dvořáková et al. [14] described that 20% of students reported online learning more stressful than face-to-face classroom learning.

The results relating to the comparison of humanities and science (mathematics) subjects show that science subjects are more time-consuming, and have lower final grades when compared to humanities subjects, both in online and face-to-face learning modes. This is to be expected as mathematics subjects require abstract thinking, logical reasoning, and a higher level of thinking in order to understand specific concepts and contexts. This is in line with the conclusions of Haider and Al-Salman [18], who stated that the online learning mode appears to be more suitable for the humanities than for the sciences. Regarding the comparison of distance and face-to-face teaching of humanities and science subjects, a significant difference was found only in cooperation with teachers of both types of subjects, and the quality of teaching only in science subjects.

When the respondents were divided into two clusters, which were interpreted as Face-to-Face and Distance Clusters, it was interesting to find out that both clusters had the same amounts of respondents. Šácha et al. [31] arrived at a similar conclusion in their paper, which dealt with opinions of Master's program students on distance teaching of an economics-mathematics subject called Operations Research. In case of students in later semesters of their studies, it may be assumed that the number of those who prefer face-to-face teaching mode will gradually decrease, and the share of those who appreciate the benefits of online teaching and like learning at their own pace, at their preferred time in the comfort of their homes, will increase. If three clusters are considered, the numerical distribution in the Face-to-Face and Distance Clusters is similar. The above-mentioned results indicate that despite its many negative sides, online learning is accepted by a large number of students as an equivalent substitute for face-to-face courses.

In the comments, students appreciated recordings of online lectures and seminars, which helped them better understand the covered topics. At the same time, they suggested the trend of recording lectures continue even at times when in-person courses are allowed.

5. Conclusions

In conclusion, let us emphasize that the article presents students' views and perceptions regarding two types of teaching: distance and face-to-face learning. It may be claimed that students of the Faculty of Military Leadership perceived distance learning mostly positively, and assessed it as comparable to face-to-face learning mode. Most students managed to cope with it without any problems, and even half of them prefer the distance form of teaching mainly because they find it less time-consuming, which they consider to be its most significant benefit. Distance learning is more cost-effective for both the institutions and the students than traditional classroom teaching, increases access to education for students in remote areas, with limited mobility, or with family commitments, but it requires investment in technology and support for teachers and students.

By contrast, the most distinct one among the monitored disadvantages is the missing social contact with classmates, and the stress associated with technical problems, with students without a good internet connection and equipment being at a disadvantage.

When comparing mathematics, military subjects, and language subjects, students felt significant differences in the time burden each learning mode had imposed on them, with humanities subjects being perceived as less time-consuming. In humanities subjects, students also often earned better final grades.

At the same time, perception of the recordings of lectures and seminars was positive. The use of these video recordings and other specific aspects of distance learning can be potentially considered for the purpose of hybrid learning mode, especially for the combined form of study.

For these reasons, it is advisable from a sustainability perspective to combine the positive aspects of both forms of teaching and to promote blended learning.

Acknowledgements. This work was conducted within the framework of the project "Conduct of land operations (LANDOPS)".

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