Comparison of attendance-based education and online education based on student opinions

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Online and blended education has long been the focus of attention in renewing the education system. Due to the Covid-19 pandemic, online education has become unavoidable. The experience of the previous semesters allows the evaluation of online education and rethinking the future strategies that combine the benefits of attendance-based and online education. The research aims to contribute to the evaluation of online education among business higher education students in Hungary by understanding student satisfaction.

The investigations compare attendance-based education and online education. The main areas are time spent in learning, time management impacts, understanding the curriculum, contact with other students and teachers. A self-managed voluntary online survey was developed to compare attendance-based education and online education. A non-representative sample of 345 Hungarian business students from various universities was available for the analysis.

Survey results show that online education cannot replace traditional attendance-based learning. Students feel that exams are lighter, and aligning the lessons with the schedule is more simple online, but the impact on the knowledge level lags behind compared to attendance-based education. Remarkably, classroom attendance is preferred according to lesson enjoyment and contact with others. Results by study level confirm that online education is preferred more by master's students than by undergraduate students. Cluster analysis highlighted a group of students who prefer online education in most aspects. These students feel that they and the system are most prepared for online education.

Keywords: online education, attendance-based education, business education, COVID-19.

JEL codes: A29, I23.

Introduction

The COVID-19 pandemic has undoubtedly changed the teaching and learning procedures. The force of online methods became evident, but the alleviation of the crisis led to a rearrangement. Both attendance-based and online education have

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benefits and limitations. A blended form of education could meet the expectations of all affected groups, but several questions are raised. Beyond the regulation, the readiness of the teachers and students is critical. Considering the challenges of changing to online learning as technological acceptance problems, we are at the beginning of the learning process.

Applying the concept of quality management (Szintay 2005), the goal is to improve customer satisfaction through improved services and beyond those upgraded processes. Of course, ensuring the necessary resources is inevitable. In the case of higher education, it seems difficult to use the term 'customer' as in the case of a product. The customers of higher education services cannot be limited to students. Companies, local and national communities, or the government are all customers. In fact, teachers and other staff members are also customers of the system. Changing to online education affects all these groups, although their interests may be in conflict.

A comprehensive analysis and evaluation go beyond the limits of one study due to the complexity of influencing factors. The emphasis on students' opinions is highly important for designating future tasks and challenges. Moreover, the conclusions have a broader field of application since the world of work also goes online, so the success of online education is preparing the future workforce.

Forms of education

Although online education has suddenly become commonplace due to the COVID-19 pandemic, it needs to be emphasised that some efforts were made much earlier. The pandemic has just created a situation that has pushed us towards online learning. Failures and shortcomings are partly due to the long debate on the appropriate forms and to the increasingly accelerating technical development of recent decades. There was no opportunity for a mass trial of education methods, which may be the reason for the variety of blended education methods and approaches. Nevertheless, the current experience is not yet sufficient to estimate long-term effects. The current focus is on the efficiency of attendance-based and online education.

Gupta and Baveja (2014) demarcate a narrower and broader meaning of education. The narrower approach says that instruction imparted in schools and higher education institutions is education. The aims of education in this sense are measured in terms of degrees or certification, or promotion. The broader meaning

is a lifelong process, with all the experiences, knowledge, and wisdom that an individual acquires at different stages of his or her life through different forms and channels.

The forms of education can be grouped in many ways. The modes of education by Gupta and Bajeva (2014) include:

• Informal education: learning through conscious or unconscious observation, experience, or imitation at home from parents, family members, or the broader community.

• Formal education: typically provided by an institution in a structured way in terms of learning objectives, learning time, or learning support.

• Non-formal education: a mix of formal education and informal education; otherwise, informally in a formal environment. It includes forms of education that do not correspond precisely to the definition of formal education.

Formal education can be face-to-face (class attendance) when there is direct contact between the teacher and the student, or distance education when direct contact cannot be assured. The tools of distance education depend on the available technology. Letters and textbooks sent by post, corresponding forms, later CD/DVD materials, interactive materials were replaced by web-based information sharing. The ICT has become an integral part of the day-to-day learning experience. Condie and Munro (2007) noted that the evidence of this was insufficient in 2007 among pupils; nowadays, this is no longer an issue at any level of education.

There is a conceptual diversity in the interpretation of the forms of education. E-learning, online education, and other terms can be considered synonymous or sharply different approaches. It is not the purpose of this article to give an overview and judgment on the content of the terminology. Blended education is a popular form that covers recent trends. Blended learning can be described as structured learning opportunities that use more than one learning or training method, inside or outside the classroom; a combination of face-to-face instruction with computer-mediated instruction (Banditvilai 2016). Szűcs and Zarka (2008) also emphasise blended education. Considering traditional and online elements, the categorisation offers a comprehensive and practical guide (Table 1).

Table 1. Categories of education with online elements

Proportion of online content	Form of education	Description
0%	Traditional	No online technology is used. Written or oral share of knowledge.
1-29%	Web-supported	Web technology complements traditional education. A course management system or web-based learning material is included.
30-79%	Blended education	Mixed online and classroom education, learning materials are provided mainly online. Web-based interactive communication (forums) is possible.
80+%	Online education	The majority of the content is available for students online. Classroom meeting is missing or minimal.

Source: Szűcs–Zarga 2008. 55

Attendance-based and online education

Online education is actually in a particular position since the new technologies (e.g., fast internet access, web cameras, online classrooms) allow for good-quality face-to-face contact between the teachers and the students, but experience shows that it is not the same as classroom attendance. Liguori and Winkler (2020) do not believe that educational systems should replace traditional methods with online education, but distance learning should be progressed as soon as possible. Teymori and Fardin (2020) conclude that online education was considered only an alternative or educational aid before the COVID-19 outbreak. Now, serious efforts are being made to apply this kind of education in all parts of the world.

Local evidence about the benefits and threats of online education published in online blogs and scientific papers is consistent. Common factors are better time management opportunities, lack of knowledge in ICT use by both teachers and students, or availability of reliable ICT background. Lack of confidence in electronic learning must also be considered (Ametova–Mustafoeva 2020). Disadvantages usually appear in the literature as limitations. Fazekas et al. (2013) specify the main factors as disadvantages:

• Education is more impersonal than in the case of classroom attendance.

• However, it has a significant role, especially in adult education; it is difficult for students to interact.

• Social connection and informal communication are limited between the participants.

• The initial investment cost and the cost of developing the content are high.

• There may be high resistance from some leaders, groups, or individuals that needs to be addressed.

• It is required to foster a culture of self-directed learning.

Considering the pandemic-forced distance education, Ametova and Mustafoeva (2020) highlight the main benefits in terms of time and the possibility of listening to lectures free from constraints. Mupinga (2005) found this flexibility of time and space as a benefit among high school students. Based on its benefits and limitations, blended education may be a worthwhile method. Paudel (2021) is committed to blended learning and points out the necessity that the universities should adopt appropriate strategies considering the balance between online education and the face-to-face mode of teaching and learning. Based on research in Nepal, the author found that online education is not preferred to the traditional way. Büchele (2021) stands up for traditional classroom education due to its impact on better performance, highlighting that even ppt slides are harmful to full attention.

Lothridge et al. (2013) point out an important aspect of education. Online solutions are undoubtedly cheaper, especially in the case of video and web-based, automated learning materials. Considering the limitations of online education, blended learning solutions with a proper strategy may be both efficient and effective. Cost-effectiveness is important for students and institutions as well, but the sustainability of the education system becomes questionable if its usefulness is decreased. Hew and Cheung (2014) summarised the main benefits of blended education in four points:

• Ability to meet the educational needs of the students,

• Improving student-to-student communication (Fazekas et al. 2013 emphasize that it requires personal attendance),

• Reducing the average overall per-student cost,

• Improving student learning outcomes as well as lowering attrition rates.

It must be repeated that online learning and blended education have a long history and a broader methodological base than the one that has been developed in the past two years. Their benefits should not be underestimated. At the same time, the pandemic-driven educational solutions often could not follow any methodologies and approaches precisely. All of these just increase confusion in the field, which makes it even more important for education experts to focus on post-pandemic issues.

We approach the topic as management instructors of higher education institutions. Exploring the benefits and barriers of online education compared to classroom attendance can contribute to developing the curricula and methods in the near future. Our study focuses on the students; the study investigates their comparative judgment on the form of education based on the factors that have appeared in the literature.

Methods and sample

An online survey was designed to explore the opinions of higher education students. The target audience of this research is the business students of Hungarian higher education institutions. The survey includes nine questions about the aspects of learning and taking the exam based on the literature review:

- Time spent learning,
- Understanding the curriculum,
- Alignment with the daily schedule,
- Lesson enjoyment,
- Contact with the instructor,
- Contact with other students,
- Answering your questions and problems,
- Exam success (result),
- Exam ethics,
- Contribution to your future success.

The students were asked to mark their judgment on a 5-point scale:

- Attendance-based education is much better,
- Attendance-based education is better,
- Alike,
- Online education is better,
- Online education is much better.

The survey also includes five questions about the preparedness for online education of the university, the teachers, the respondents, and fellow students. The evaluation uses a 5-point scale from ‘not at all’ to ‘excellent’. Gender (female or male), level of study (undergraduate or master), and work experience (no, only internship, yes) were used as grouping factors.

The sample consists of 345 responses from various universities. The representativeness of the sample is not ensured; the research can be considered a pilot study. The data collection period was between September 2020 and April 2021.

A reliability analysis of the survey was conducted; Cronbach's Alpha value is 0.843 for the 14 evaluation questions. The item-total statistics are presented in Table 2.

Table 2. Reliability test of the survey

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item - Total Correlation	Cronbach's Alpha if Item Deleted
How prepared do you consider your university is for online education?	38.51	67.570	0.285	0.844
How prepared do you consider your teachers are for online education?	38.50	68.582	0.218	0.847
How prepared do you consider yourself for online education?	38.23	63.042	0.565	0.828
How prepared do you consider your fellow students are for online education?	38.34	65.936	0.434	0.836
Time spent learning	39.34	61.143	0.542	0.829
Understanding the curriculum	40.00	61.259	0.614	0.824
Alignment with the daily schedule	38.49	60.286	0.544	0.829
Lesson enjoyment	39.69	61.591	0.561	0.827
Contact with the instructor	39.97	63.168	0.510	0.831
Contact with other students	40.25	65.967	0.357	0.840
Answering your questions and problems	39.79	62.034	0.612	0.825
Exam success (result)	38.83	63.656	0.428	0.837
Exam ethics	39.67	64.577	0.436	0.836
Contribution to your future success	39.66	61.456	0.612	0.824

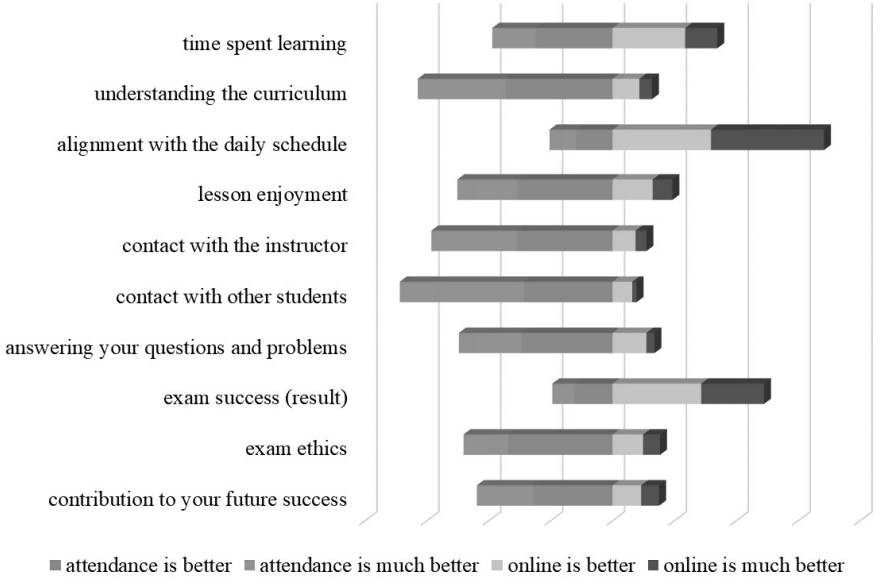
Source: Own research

The measurement level of the question allows for frequency analysis, cross-tabulation, and non-parametric variance analysis. For exploring the characteristic patterns of students' opinions, cluster analysis was performed. Hierarchical clustering was applied with the Ward method (squared Euclidean distance) to minimise the scattering of the clusters. The cluster analysis is based on the nine questions used for comparing attendance-based and online education. Since the responses show significant and sometimes high correlation values, a factor analysis of the data was conducted. The procedure follows the guide developed by Pallant (2020). Statistical tests are calculated under a 5% confidence level.

Results and discussion

Comparison of attendance-based and online education

Survey results (Figure 1) suggest that students prefer attendance-based education according to the core elements of learning, including understanding the curriculum, contribution to future success, and lesson enjoyment. Attendance-based education is also preferred for keeping in contact with the teachers and other students. The respondents found the main benefit of online education in the time management opportunities. Exams are considered ethically questionable in the case of online education, and there is a high level of agreement about the better results achievable with an online exam. It is to note that the proportion of 'alike' responses is remarkable (Table 3). The highest values concern the contribution to the future success, receiving answers to students' questions, and exam ethics.



Source: Own research

Figure 1. Evaluation of attendance-based and online education (preferred by % of the students)

Table 3 summarises the distribution of responses by grouping the 'better' and 'much better' responses.

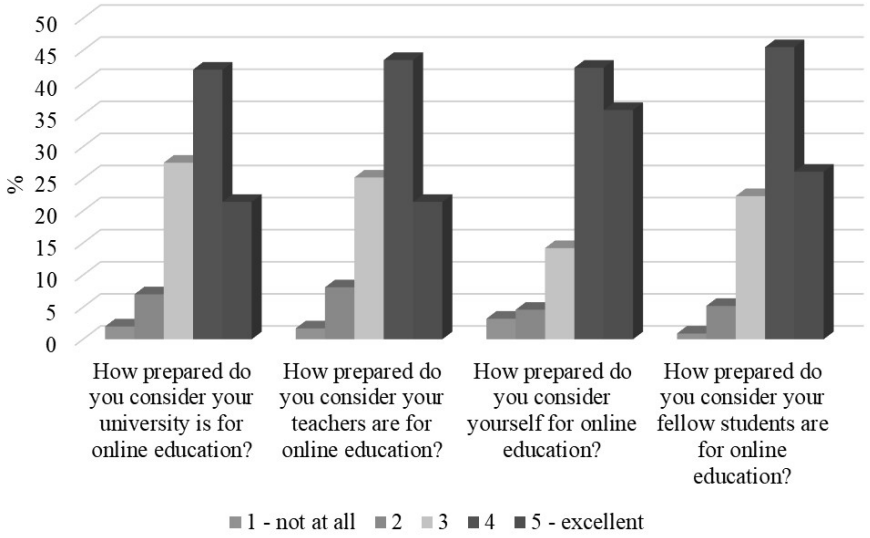
Table 3. Preferences of the students (total sample, data in %)

	Attendance is better or much better	Alike	Online is much better
Core elements of education			
Understanding the curriculum	62.9	24.3	12.8
Contribution to your future success	43.8	41.2	15.1
Lesson enjoyment	50.1	30.4	19.4
Contact			
Contact with the instructor	58.5	30.4	11
Contact with other students	68.7	23.5	7.8
Answering your questions and problems	49.6	36.8	13.6
Time management			
Alignment with the daily schedule	20.3	11.3	68.4
Time spent learning	38.8	27.2	33.9
Exam			
Exam success (result)	19.4	31.6	49
Exam ethics	48.1	36.5	15.4

Source: Own research

Considering online education as a future pillar of the higher education systems, survey results suggest several development opportunities. The benefits of time management seem obvious, but other results give emphasis to the lack of effective utilisation. The main reason for preferring attendance-based education in the core aspects of education may be the readiness of the institutions and the teacher. We should not forget that, due to the COVID-19 pandemic, urgent solutions were pushed through without a proper preparation of technical and technological conditions. Moreover, this was an elementary change for students, as well.

The preparedness of the affected groups was assessed by the students, as presented in Figure 2. The results do not reflect our assumption. Good and excellent ratings are in the majority; students show a positive approach to the problem. Uncertain (3) responses on the 5-point scale have the highest ratio when it comes to the preparedness of the university and the teachers, while a remarkably lower value concerns the respondents' own preparedness.



Source: Own research

Figure 2. Evaluation of preparedness for online education

Although the distribution of students' assessment denotes most students' preferences for attendance-based or online education, both the high rate of uncertain (alike) responses and the balanced results for some questions indicate that the sample could be divided into significant sub-samples. The non-parametric Kruskal-Wallis H-test was applied for variance analysis by gender, study level, and work experience (Table 4).

Gender is proved to be a significant grouping factor in the case of four questions. Based on the mean values of the evaluations, female respondents (3.78) find their university more prepared for online education than males (3.68). Male respondents prefer attendance-based education when it comes to understanding the curriculum. They prefer online solutions more than females for aligning the daily schedule. Exam results are found more favorable by both females and males; however, the latter group is much more in agreement with this. Work experience is proved to be a significant grouping factor according to the preparedness of the university. Students with an intern position (3.45) have a less favorable opinion than those employed (3.86) or those without work experience (3.76). The study level shows significant differences in most questions of the survey.

Table 4. Non-parametric analysis of Variance (Kruskal-Wallis H) by grouping factors

	Gender			Study level			Work experience		
	K-W H	d_f	Sig.	K-W H	d_f	Sig.	K-W H	d_f	Sig.
How prepared do you consider your university is for online education?	0.664	1	0.415	1.755	1	0.185	12.443	2	0.002
How prepared do you consider your teachers are for online education?	6.44	1	0.011	10.553	1	0.001	4.949	2	0.084
How prepared do you consider yourself for online education?	2.617	1	0.106	4.083	1	0.043	3.701	2	0.157
How prepared do you consider your fellow students are for online education?	0.29	1	0.59	4.208	1	0.04	2.56	2	0.278
Time spent learning	2.561	1	0.11	2.868	1	0.09	0.233	2	0.89
Understanding the curriculum	4.498	1	0.034	8.135	1	0.004	2.17	2	0.338
Alignment with the daily schedule	5.317	1	0.021	7.331	1	0.007	3.798	2	0.15
Lesson enjoyment	0.311	1	0.577	9.233	1	0.002	3.738	2	0.154
Contact with the instructor	1.075	1	0.3	0.057	1	0.811	0.231	2	0.891
Contact with other students	0.597	1	0.44	6.737	1	0.009	0.721	2	0.697
Answering your questions and problems	3.196	1	0.074	4.928	1	0.026	1.455	2	0.483
Exam success (result)	9.787	1	0.002	0.635	1	0.425	1.481	2	0.477
Exam ethics	0.454	1	0.501	0.947	1	0.330	3.198	2	0.202
Contribution to future success	0.712	1	0.399	0.098	1	0.754	1.322	2	0.516

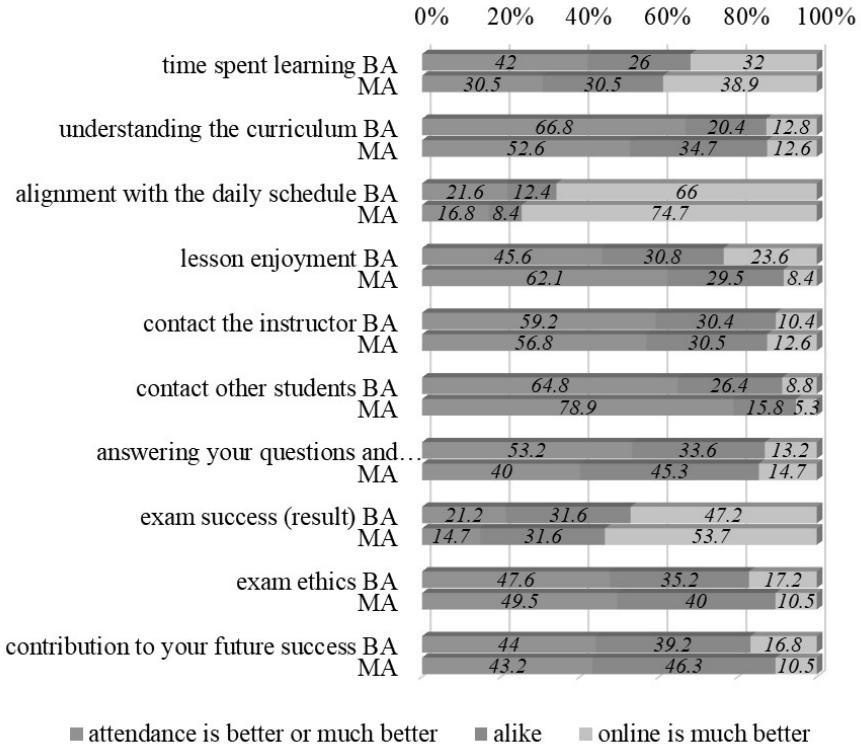
Source: Own research

Results by study level

Different study levels may require various methods of education. Practice shows that undergaduate studies should give the basic knowledge in the field. Students usually come to university without professional knowledge. Learning the terminology, the procedures, and the basic methodology has a long-term impact on their competencies. We assume that undergaduate studies substantially require attendance-based education to control competency development. The training components of undergaduate programmes are more difficult to implement online.

Moreover, higher education institutions usually have experience primarily in attendance-based education. In contracts, master-level students must have the basic knowledge in their professional field; further training and knowledge deepening

are available through a more significant presence of online items. Comparing the study levels based on the situational leadership model (Hersey–Blanchard 1977), undergraduate students require a more directive and less supportive behaviour from teachers, while master's students can be managed by participative (high supportive behaviour) or delegating (low supportive behaviour) styles of education. Survey results (Figure 3) only partially support these assumptions.



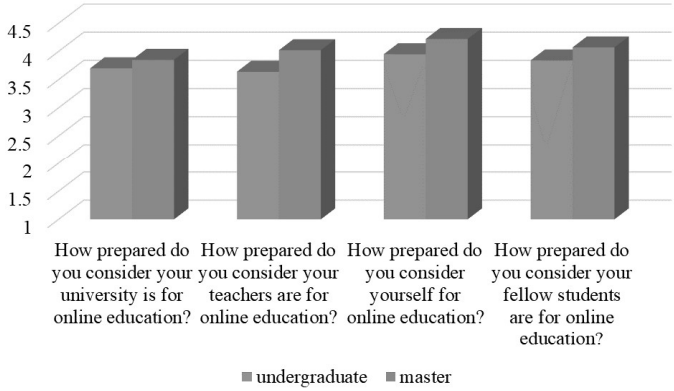
Source: Own research

Figure 3. Evaluation of attendance-based and online education by study level (%)

Online education is considered a better option for time management issues and exam results. As far as understanding the curriculum is concerned,

the share of 'alike' answers is remarkably higher among master's students than among undergraduate students. Furthermore, the contribution to future success is judged better by a higher proportion of undergraduate students. It is to note that only 16.8% of undergraduate students and 10.5% of master's students believe that online education has a better contribution to their success than attendance-based education, while 44% and 43.2%, respectively, prefer attendance-based learning. As regards lesson enjoyment and contact with other students, master's students prefer non-online personal contacts more than undergraduate students.

Preparedness is rated higher by master's students in each aspect based on the mean value of the ratings (Figure 4).

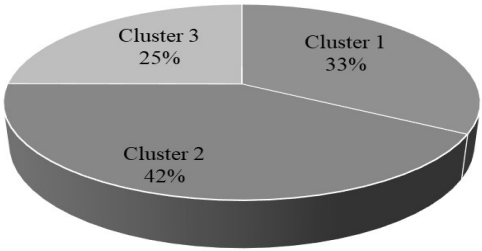


Source: Own research

Figure 4. Evaluation of preparedness for online education by study level (mean values)

Clusters of opinions

However, the grouping factor of the analysis did not show significant differences; the distribution of the responses suggests characteristic opinion patterns. Based on the comparative assessment of attendance-based and online education, the cluster analysis allowed us to form three clusters. Figure 5 shows the size of the clusters.



Source: Own research

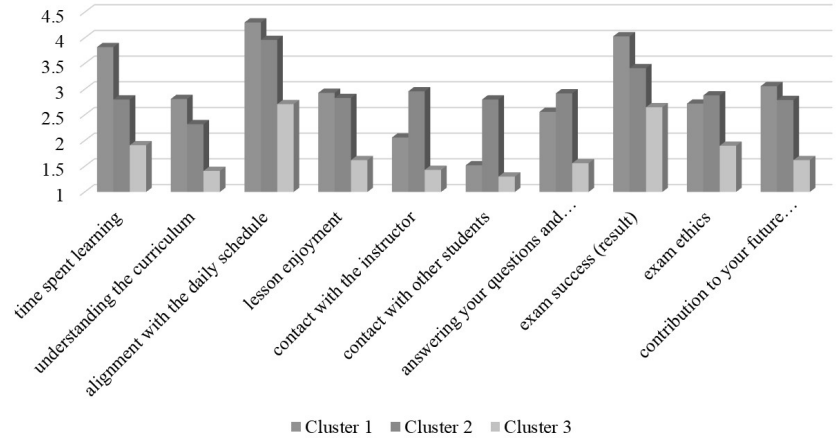
Figure 5. Cluster sizes (%)

According to the mean values of the responses, the lower values in Figure 6 show that attendance-based education is preferred, and higher values suggest the preference for online education. The most populous cluster (Cluster 2) represents medium values in most questions. Alignment with their daily schedule and exam success are prominent. In these cases, the preference for online learning is dominant. The reason for this can be both the high proportion of the 'alike' responses and the mixing of opinions (see Figure 7). 'Alike' responses are usually in the majority, except for the questions about understanding the curriculum and daily schedule adjustment.

Cluster 1 represents the students who prefer online education. It is to note that understanding the core of the curriculum and keeping in contact with others show different results.

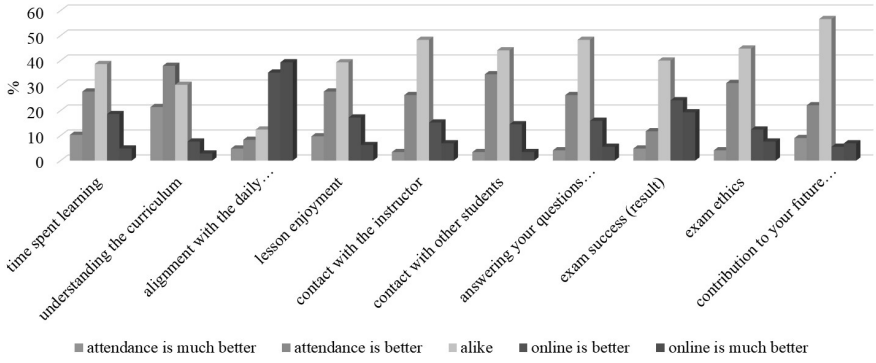
Students in Cluster 3 can be considered traditional students, and they obviously prefer attendance-based education. In parallel, the students acknowledge the benefits of online education in alignment with the daily schedule and the exam results.

The assessment of preparedness is checked in the clusters. The analysis of the variance test (Table 5) shows significant differences in respondents' and other students' results. The mean values are presented in Figure 8. Students who prefer online education (Cluster 1) show the highest values and those who prefer attendance-based solutions (Cluster 3), the lowest.



Source: Own research

Figure 6. Evaluation of attendance-based and online education by cluster (mean values)



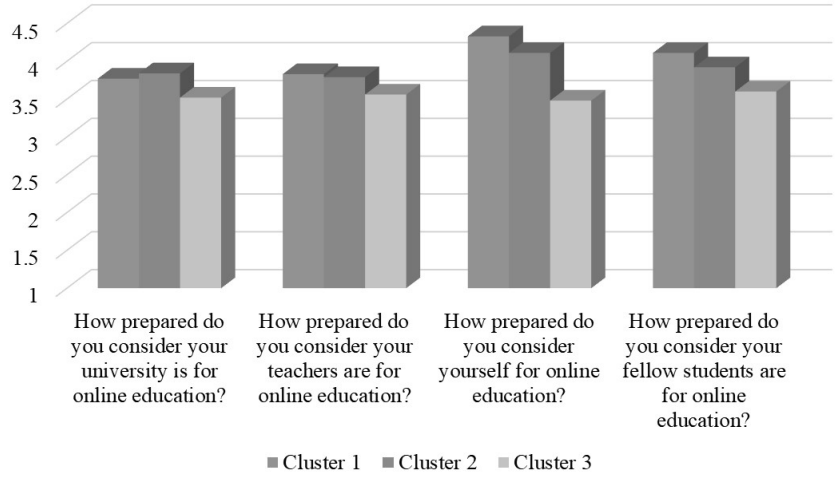
Source: Own research

Figure 7. Evaluation of attendance-based and online education in Cluster 2 (%)

Table 5. Non-parametric analysis of variance (Kruskal-Wallis H) by cluster membership

	Kruskal-Wallis H	d_f	Asymp. Sig.
How prepared do you consider your university is for online education?	5.727	2	.057
How prepared do you consider your teachers are for online education?	5.260	2	.072
How prepared do you consider yourself for online education?	38.017	2	.000
How prepared do you consider your fellow students are for online education?	18.068	2	.000

Source: Own research



Source: Own research

Figure 8. Evaluation of preparedness for online education by cluster (mean values)

Conclusions

Online education has become inescapable. The COVID-19 pandemic has created a social necessity and a regulatory environment for it. However, online education was not born with this pandemic, just boosted up. After completing several semesters with full or partial online education, we should already have enough experience with online education; we are beyond the initial shock.

It could be expected that the pandemic will bring a breakthrough in the paradigm of the form of education. Although many benefits of online education and online solutions beyond education are promising in the long term in society, the study results advise caution. It has to be noted that legal support for online higher education was missing before the pandemic; it was expressly forbidden for undergraduate and master's programmes. Blended elements were limited in these programmes. Compared to this approach, the quickly introduced and forced online higher education has many shortcomings.

As a result, people are not prepared for the paradigm shift. It is clear that online conferences and thesis defenses are environmentally friendly since they do not require any travelling, more research and publications can be produced, there are greater opportunities for cheating during an exam, the stress of personal meetings can be reduced. At the same time, personal contacts and feedback are pushed into the background, and social relations are degraded. Sitting for too long in front of the computer leads to significant health problems (Berényi et al. 2021).

The results confirm that online education helps with time management issues and exam success, but the core elements of education and keeping in contact with others require traditional forms based on respondents' opinions.

Although the long-term impacts of the change cannot be explored based on the available knowledge, efforts should be made to design future strategies in the field. Cluster analysis results do not show significant relations between cluster membership and grouping factors such as gender, study level, or work experience, but cluster sizes are remarkable. It is encouraging that the proportion of students who prefer online education is 33%. On the other hand, 25% clearly prefer attendance-based education, and the majority of the respondents (42%) belong to the group without a definite value judgment. A relevant future task is to explore whether 'alike' responses reflect students' high level of flexibility or disinterest in the subject.

Another question is the sustainability of the newly introduced online solutions. Since online education during the pandemic was forced by the situation, the service quality expectations will suddenly and sharply increase after the termination of the constraints. The main challenge for the education system is to evaluate the benefits and limitations so as to find the appropriate weight, form, and target areas of online education.

Despite the large sample and the careful survey design, some limitations of the study must be mentioned. Since the representativeness of the sample is not ensured, the general interpretation of the results is not feasible. Data collection is limited to Hungarian higher education institutions and business students; the regulatory systems of other countries and the culture of various faculties are not considered. Along with the limitations, the analysis and the results may serve as a starting point for further studies.

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