POSSIBLE FACTORS DETERMINING SATISFACTION OF DISTANCE EDUCATION AMONG UNIVERSITY STUDENTS

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Abstract

The aim of the study was to find out the factors, which significantly affected satisfaction with distance education among university students (undergraduate students). Complete data were obtained from 1283 respondents from different faculties in Czech Republic during the second term in academic year 2021/2022. The items in research tool were Likert type and also semantic differential was used. The descriptive, inferential and multidimensional statistic were used for data evaluation. Independent variables like: Evaluation factor for full-time form; Activity factor for full-time form; Difficulty factor for combined form; Evaluation factor for combined form; Activity factor for combined form; Perception of distance learning through negatives and Perception of distance learning through positives were as significant, which influenced satisfaction with distance education. Implications for pedagogical practice are presented in the conclusion part.
Keywords: *multiple regression model, quantitative approach, satisfaction of distance education, university students*

Introduction

Distance education is in the easy way a type of education, where the learner is not physically presented at the lesson. The last years (2020 and 2021) bring a huge number of opportunities, how to correctly and effectively use different tools, which distance education offers. However, it is important to reflect that pandemic situation revealed lack of experiences with educational technology and work with it (Bergdahl & Nouri, 2021). This situation created a big pressure on both sides of education process, what led to different approaches of teaching process. And these various situations could cause severe distinct perceptions toward distance education. The using of distance learning brought many advantages and disadvantages. Respondents evaluated positively for example the time flexibility, and low financial burden. As disadvantages were mentioned for example social isolation, procrastination, and missing lecturers (Lamanauskas & Makarskaitė-Petkevičiené, 2021; Srivastava, 2019; Yasynska, 2020, Zhao et al., 2020).

Except for the concept "distance education", other terms occur, the main difference among them is shown below. Distance education is based on a didactically high-quality design of materials, which must replace the interactivity between the student and the teacher that is common in face-to-face teaching, and it is based primarily on self-study (Ng, 2019). In contrast, online education (e-learning) is teaching to use computer technology, electronic devices, and the Internet. Online learning regularly involves face-to-face interaction between teachers and students. The characteristics of emergency remote teaching are a sudden, uncertain start, constant variability due to the epidemiological situation, lack of time to prepare everything flawlessly in advance, or the diverse home background of the students, which the school can only influence to a limited extent (Tulaskar & Turunen, 2022).

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Current State of Literature

Some researchers focused on the satisfaction with distance education on their institution. For example, Datt and Singh (2021) found out that students were satisfied with e-services, such as online admissions, online examination forms, access to view and download evaluation results. Jegathesan et al. (2018) and Rajabalee and Santally (2021) found out positive correlation between distance education satisfaction and performance. The perception of the distance form of education in the sense of e-learning, therefore, passes through the perception of ICT technologies in education. From the perspective of e-learning, which is necessary for distance learning, students' perceptions of ICT technologies appear to be a key factor (Rafiq et al., 2020). Students' attitudes and perceptions of these technologies have already been mentioned in research, but most studies have focused only on technologies and their acceptance by students (Sharma et al., 2020). To some extent, the question of students' perceptions of distance form of education (e-learning) remains neglected. As the research described by Johnson et al. (2021) shows, most students have reasonably strong ICT skills and a positive attitude towards e-learning. In developed countries, university students have different attitudes towards e-learning, however, most of them report a positive perspective. In contrast, the lack of choice of form of education and the need to be constantly in the information space has caused an increase in tension and resistance among teachers as well as students (Thatcher et al., 2020). The results have shown that students in general prefer face-to-face education over distance learning. On the other hand, working students (part-time or full-time) reported a positive approach to distance education (Benhima, 2021).

The perception of the distance form of teaching and technologies in education is generally closely related to the issue of socio-economic status. Some students with low socio-economic situations have got more problematic access toward modern technologies, distance education is for them more demanding (Yang et al., 2018; Chillemi et al., 2020). From the point of view of Roger's theory of diffusion of innovations, it holds that the socio-economic status influences the probability of acceptance of a given innovation. The level of the family SES has a positive correlation with the pupil's own success. Some authors add that pupils with a high level of SES perform better than pupils from the middle class, who, however, perform better than pupils from families with low SES. This aspect can be measured both objectively (using appropriate tools) and subjectively (self-assessment of one's position) where the result is a kind of subjective classification of the individual into a particular social group or class. The strong influence of SES (especially the education of parents) on the school success of the pupil has already been addressed by many experts (for example Farooq et al., 2011). Their research, as well as a number of other probes, show that the socio-economic status in terms of parental education causes pupils of more educated or better-off parents perform better at school than other pupils. It is an important variable because the development of human capital is linked not only to the well-being of an individual, but also results in increased productivity, leading to new sources of income which means increasing economic growth of a country. Similar results were possible to find out in the study by the Chytry et al. (2022).

On the basis of theoretical framework, the aim of the study was to find out, which factors influenced the satisfaction with distance education among university students.

Research Methodology

General Background

The study has got a quantitative approach toward obtaining and analyzing data. The study is an exploratory, correlational type, aimed to research selection of factors influencing

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satisfaction with distance education among university students. All variables were measured with valid and reliable scales. Data were collected in the middle of the second term in academic year 2021/2022 and the data collection took two months.

Sample Selection

The calculation of the size of the file was calculated based on the Sample Size Calculator with Confidence Level 95 % and Margin of Error 5 % (Population Proportion 50 %) with a base file of $N = 304000$. The detected sample size is $N = 385$. This means 385 or more measurements/surveys are needed to have a confidence level of 95 % that the real value is within ±5 % of the measured/surveyed value. Complete data were obtained from 1283 respondents (men = 259, 20 %, women 1024, 80 %). These respondents attended both full-time ($N = 826$, 64 %) and combined ($N = 457$, 36 %) forms of study. Respondents also attended various secondary schools: grammar school ($N = 500$, 39 %), secondary pedagogical school ($N = 141$, 11 %), secondary art school ($N = 57$, 4 %), secondary vocational training school ($N = 12$, 1 %), secondary medical school ($N = 73$, 6 %), secondary technical school ($N = 90$, 7 %), secondary business school ($N = 14$, 11 %), and secondary vocational school ($N = 269$, 21 %).

The composition of the respondents is also diverse in terms of the studied faculty. As the field of expertise is education, the maximum focus was placed on the students of faculties of education ($N = 452$) or faculties of socioeconomics ($N = 225$). Respondents were selected from various universities and faculties in order to map various places in the Czech Republic.

Instrument and Procedures

A total of six research tools were used in data collection. These instruments are built on Likert scales and are not evaluated individually, but as a whole (or on the basis of partial subtests (table 1 in more detail). Due to the continuation of the Covid-19 pandemic, the individual tools were distributed to the respondents in electronic form. The table 1 shows how many items these tools have, what their focus is, and what the psychometric features are. The detailed description of used scales is presented in the following subchapter.

Data Analysis

Due to the nature of the data, first the Cronbach α coefficient was calculated which determines the internal consistency of the tool and can take values in the range ⟨0.1⟩ with generally acceptable values of the coefficient being between .70 and .95 (Tavakol & Dennick, 2011). This interval can be specified as follows: minimally acceptable (>.70), good (> .80) or excellent (> .90) (George & Mallery, 2003). In this context, the work of van Griethuijsen et al. should be mentioned (2015), who declare that the values between .60 and .70 are acceptable (this question is discussed in detail mainly due to the use of the tool focusing on the relationship to the full-time form of study).

The last limit, which is the strictest for estimating reliability, is also mentioned by Hopkins (1998), who states that while standardizing a research tool only reliability higher than .90 can be considered sufficient. In the presented paper, the analysis of psychometric features was supplemented by the values of split-half reliability due to a slightly lower value of one of the variables (Relation to the full-time form of study). Split-half reliability was always calculated with reduction based on Spearman – Brown correction (Table 1).

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Table 1

Description of Tool Evaluation + Measured Reliability

Tool focus	Number of items	Features	Evaluation
Satisfaction with distance form of learning (SwDFE)	8	$\alpha_{cr} = .83$, split half = .84	Sum of individual items. Values range from 8 to 40. The higher the value, the worse the relationship to the distance form of education.
Perceives distance learning through positives	12	$\alpha_{cr} = .80$, split half = .87	Sum of individual items. Values range from 12 to 60. The higher the value the better the relationship to the distance form of education.
Perceives distance learning through negatives	8	$\alpha_{cr} = .84$, split half = .86	Sum of individual items. Values range from 8 to 40. The higher the value, the worse the relationship to the distance form of education.
Relationship to full-time form of study	9	$\alpha_{cr} = .68$, split half = .77	Items divided according to factors into: e – evaluation factor (3 items) - values 3 – 21 d – difficulty factor (3 items) - values 3 – 21 a – activity factor (3 items) - value 3 – 21 The sum of individual items is worked with
Relationship to combined form of study	9	$\alpha_{cr} = .73$, split half = .85	Items divided according to factors into: e – evaluation factor (3 items) - values 3 – 21 d – difficulty factor (3 items) - values 3 – 21 a – activity factor (3 items) - value 3 – 21 The sum of individual items is worked with.
Socio-economic status	7	Not measured	Evaluated through octiles on a scale 1-7. The lower the value, the higher the SES.

Based on the values from table 1 it is clear that it is possible to continue working with these individual tools. These tools are usually based on the Likert scale, or a semantic differential is used. The only exception occurs in the case of socio-economic status (more details below). In the case of tools built on the Likert scale (*) both a seven-point scale (*a) and a 5- point scale (*b) are used and from the perspective of psychometric features there is no difference between them. When the evaluation of the entire Likert scale (in this case of a specific tool) is discussed then one variable is meant which was created by merging (in this case the sum of) items into one variable (Boone & Boone, 2012). In this case, it will be based on the conclusions and the use of the scale by a number of authors (for example, Baggaley & Hull, 1983; Maurer & Pierce, 1998) and considered by the given variable an interval. According to Boone and Boone (2012), it is necessary to use parametric statistical methods to process data on an interval scale. At this

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point, it should be mentioned that due to the size of the set ($n \geq 20$), the approximation using the central limit theorem, which simply says that the sum of a large number of random variables behaves as a normal distribution, can be used. For this reason, the use of parametrical statistical methods will continue.

The satisfaction with distance learning was considered a dependent variable and all the others are considered independent variables. The detection of outlying values was performed by the method of internal walls. Based on the minimum and maximum compared to the values of the outer walls, it is possible to say that none of the variables will be removed from the data matrix because none of them becomes extremely remote. Testing of data normality was performed on the basis of the Shapiro-Wilk test for normality at the 5% level of significance (the conclusions confirm the possibility of using parametric statistical methods, as indicated above).

The last method used was to map the socio-economic status, where the socio-economic score of the household and then the ABCDE classification was used. Both were developed and designed by MEDIARESEARCH, JSC. The ABCDE classification is defined as a categorization of the socio-economic score of households. It contains 8 categories A, B, C1, C2, C3, D1, D2, and E, which are defined as octile of the socio-economic score in the population of all households in the Czech Republic. The following table contains the limits for the socio-economic scores defining the individual ABCDE categories (limits valid for the calendar year 2021 – table 2).

Table 2
The Limits for the Socio-economic Scores

ABCDE category	Socio-economic score of a household		ABCDE category	Socio-economic score of a household	
	From	To		From	To
A	1.38	-----	C3	.87	.96
B	1.18	1.38	D1	.74	.87
C1	1.06	1.18	D2	.63	.74
C2	.96	1.06	E	-----	.63

In this case, category A contains households that are at least 1,375 times better socio-economically situated than the average given by category C2, whose limits are approximately from .96 to 1.06. The categorization of the socio-economic score in order to obtain the ABCDE categories in the SPSS syntax and the possibility of compiling regression models valid for the year 2021 (with different limits compared to the 2020 calibration highlighted yellow) are as follows:

if (score > .63) ABCDE = 7, if (score > .74) ABCDE = 6, if (score > .87) ABCDE = 5, if (score > .96) ABCDE = 4, if (score > 1.06) ABCDE = 3, if (score > 1.18) ABCDE = 2, if (score > 1.38) ABCDE = 1. Overall, the respondent was assigned a value of 1 – 8, where the lower the value, the higher the socio-economic status of the household.

Research Results

Data analysis was done by compiling a regression model, which included the following 12 factors: F1 – Satisfaction with distance learning, F2 – Difficulty factor for full-time form,

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F3 – Evaluation factor for full-time form, F4 – Activity factor for full-time form, F5 – Difficulty factor for combined form, F6 – Evaluation factor for combined form, F7 – Activity factor for combined form, F8 – Perception of distance learning through negatives, F9 – Perception of distance learning through positives, F10 – Socio-economic status, F11 – Age, F12 – Length of practice in education. The values of the descriptive analysis are given in the following table 3.

Table 3
Descriptive Analysis for Individual Factors

	M	*Md*	*Mo*	*SD*	max	min
F1	23.26	24	30	8.19	40	8
F2	11.92	12	12	4.21	21	3
F3	10.49	11	12	4.13	21	3
F4	10.66	11	12	3.08	21	3
F5	12.39	12	12	4.38	21	3
F6	11.14	12	12	4.19	21	3
F7	11.44	12	12	3.27	21	3
F8	31.32	30	27	9.83	60	12
F9	16.71	16	8	7.29	40	8
F10	4.49	5	6	2.02	8	1
F11	26.72	23	21	8.52	59	19
F12	3.71	0	0	6	45	0

In order to be able to use regression models, it was necessary to verify the partial properties of the measured data. The estimation of homoskedasticity was performed on the basis of scatter plots. This comparison shows no systematic dependencies. The error component has a constant variance (for each observation the respective vector component has the same variance – so-called homoskedasticity can be assumed. With the exception of the factor F1-F9 ($r = .67$, $p < .001$), the correlation is low in all cases and satisfies the condition set out above. Here the absolute value of the Pearson correlation coefficient is less than .80, it shows collinearity is very less likely to exist. The coefficients for multiple correlation are shown in the following table 4.

Table 4
Correlation Matrix for Individual Factors

	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12
F1	-.27	-.35	-.32	.47	.54	.50	-.58	.67	.02	-.18	-.02
F2		.59	.46	-.07	-.18	-.15	.24	-.25	.04	.05	.01
F3			.65	-.23	-.23	-.20	.30	-.28	.00	.04	-.02
F4				-.21	-.20	-.17	.30	-.27	-.02	-.03	-.03
F5					.71	.58	-.36	.37	.06	-.09	.00
F6						.74	-.41	.44	.03	-.25	-.03
F7							-.39	.39	.04	-.29	-.05
F8								-.38	.00	.14	.00
F9									.05	-.10	-.03
F10										-.05	-.03
F11											.17

Value R = .79 shows there is a positive correlation between the variables. The R^2 = .62 shows that 61.90 % of the movement in the dependent variable can be explained by the independent variables and the rest 38.10 % remains unexplained (R^2 = .62; $F_{(11, 1267)}$ = 187.18, $p < .001$; SEM: 5.08). The adjusted R^2 = .62 gives the idea of how well the model generalizes.

It is clear from the table that a total of four variables are not significant for the model. The value of VIF is 1 < VIF < 5; it specifies that the variables are moderately correlated to each other. The small values of VIF corresponding to the variables show that there is no problem of collinearity. In the further analysis, those regressors that prove to be insignificant at at least 5 % level of significance are omitted. These regressors included F2 – Difficulty factor for full-time form, F4 – Activity factor for full-time form, F10 – Socio-economic status, F11 – Age, F12 – Length of practice in education (table 5).

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Table 5

Multiple Regression (Forward Stepwise Method) on Distance Education Satisfaction

	β	$\beta \pm SE$	B	B $\pm$ SE	t(628)	p
Intercept			20.15	1.30	15.51	< .001
F2	-.01	.02	-.02	.04	-.55	.59
F3	-.07	.03	-.13	.05	-2.56	< .05
F4	-.02	.02	-.06	.06	-.93	.35
F5	.07	.03	.14	.05	2.88	< .01
F6	.08	.03	.16	.06	2.68	< .01
F7	.09	.03	.22	.07	3.31	< .001
F8	-.29	.02	-.24	.02	-14.24	< .001
F9	.43	.02	.48	.02	20.92	< .001
F10	-.01	.02	-.05	.07	-.64	.52
F11	-.04	.02	-.04	.02	-1.97	< .05
F12	.00	.02	.00	.02	.20	.84

Discussion

The aim of the study was to find out factors, which influenced the satisfaction with distance learning among college students from different universities of Czech Republic. The satisfaction with distance learning was positive among college students. These findings were in concordance with similar studies concerning the same problems. For example, according El Refae et al. (2021), students were more satisfied with distance learning due to its higher amount of advantages and opportunities. The similar results were possible to find in other studies like Baber (2020) or Holzer et al. (2021). This result was possibly caused by a quick and good preparation of universities on the unknown situation, which was the pandemic situation and suddenly closing off face-to-face learning and jump to distance education. Also, the professional skills of college teachers to change the teaching from full-time to distance education process. This activity was demanding and time-wasting and required amount of effort to prepare appropriate electronic environment for the distance learning of students. Without this, the positive evaluation of distance learning students from different types of faculties would not be possible.

The factors of evaluation for full-time and distance learning were significant. The presumptions were confirmed because the evaluation of full-time learning negatively correlated with the significance of a distance learning factor. And the factors like evaluation, activity, and difficulty of distance learning positively correlated with the significance of distance learning. These correlations/relationships were studied only marginal in the second way around the main study. However, it is possible to find some paths about similar findings presented in the study of Fojtik (2015), Griffiths (2016). As Fojtik (2015) quoted students had a feeling that distance education was not so demanding. Then they are surprised that they have to complete several exercises or corresponding tasks during the semester. Fojtik (2015) also wrote that the level of success was higher among distance students. According to this fact it is possible to say that distance learning was not perceived as a demanding activity because in home environment that was a classroom for students, the climate for the listening of lectures and also for learning activities was more pleasant. Students have got the possibility to use different learning aids,

which were not so accessible during full-time learning process, where students had to focus attention on the lecturer and they did not have access to different manners of help through teaching process like access to internet, using of mobile phones, etc. On the basis of this, the level of difficulty was decreasing, also the possibilities of evaluation are changing with the respect of transition from face-to-face learning process to distance. Teachers did not have so many control mechanisms as it was during full-time teaching process. So, it was easy for students to achieve better evaluation during distance learning. This idea was supported by other studies, like Hobson and Puruhito (2018) or Stojanovic et al. (2021), where it is also possible to find hidden ideas about different ways, why students achieved better scores on tests or in the exams during distance learning. Here there are for example, better possibilities to use learning aids, lack of nervousness, cooperation with schoolmates, etc.

The perception of distance learning through positives significantly correlates with student satisfaction in online classes. The similar results were possible to find in the study of Mucci-Ferris et al. (2021) or Rizun and Strzelecki (2020). These findings are connected with the previous paragraph because of the possibilities of pros. Students assured that distance learning era discovered many possibilities how to make their study easier. Also, there is a fact of the presentation of learning material from the side of the teacher. There is a big chance that this activity is different from face-to-face. Teachers are not eligible to control all activities of students during the teaching process, which is conducted through different electronic media. So, students could through different social sites, message channels, and other forums. These forms could not be visible for teachers through video-cameras. Also, during tests or exams it can be easier for students to make academic cheating, which is more possible to do in your own room. All these facts could lead to more positive view of distance learning.

The age had a significant effect on the satisfaction with distance learning. The older respondents had lower satisfaction with distance learning in comparison with younger ones. The similar result was found out by the authors Barczyk et al. (2017), where the younger respondents higher valued clarity and appropriateness of the assessments and clear criteria for grading. Also, they placed a high value on the tools and media that support learning objectives and classmate interactivity. Similar results were also published in the study of Botha and Coetzeee (2016). This is the reason why older respondents are more restrained with the using of electronic tools for the educational purposes and are not so satisfied with the distance learning. Maybe, there is a little bit of fear with the using of electronic devices during distance learning. On the basis of this fact, they are not willing to use special functions of hardware and software, which are connected with the using of electronic media during the learning process. This fact can lead into stress conditions during the learning process, and it can have a big impact on the evaluation of satisfaction with distance learning.

Conclusions and Implications

According to the findings presented in the previous chapters, it is an obvious difference between full-time and distance learning. The respondents perceived distance learning as not so demanding, and they are satisfied with this approach of learning. It could be caused by different requirements during distance learning, which made the process of learning and teaching easier, so students achieved better scores in tests and exams and then they were satisfied with this kind of learning. So, the processes of control mechanisms could be more sophisticated due to equalization of distance and full-time learning achievements. Age of respondents also manifested as a significant factor, so the way of distance learning should be more accessible and user-friendly for the higher age cohorts. However, this process is in the IT departments of universities. The socio-economic status was not shown as a significant factor because in the Czech Republic conditions, this variable is important in terms of the success of pupils in

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primary schools as well as students in secondary schools. On the basis of this, the age together with SES created common variables, where the effect of SES was eliminated. In the further research the focus should be focused more on psychological aspects of using distance learning, like the level of stress conditions, which can influence the perception of distance learning. Also, the comparison of pupils of high schools with university students in the aspects of distance learning could be interesting.

Acknowledgements

Declaration of Interest

The authors declare no competing interest.

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