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FIRST YEAR STUDENT ATTITUDES TOWARD DISTANCE LEARNING

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Abstract: *Over the last two years, since the beginning of the COVID-19 pandemic, Higher Education Institutions (HEIs) in Serbia worked in the modality of distance learning – instructions and students` assignments were performed by distance, while colloquia and exams were realized in traditional conditions. Regardless of modality, HEIs have to ensure high-quality education in every single course. In this sense, the feedback from students is very important. The purpose of this study is to investigate students` attitudes about four dimensions of distance learning – fulfilment of preconditions, organization and realization of instructions, advantages/disadvantages of distance learning, communication and social interactions. Data was collected from 183 first-year students within three courses at The Academy of Applied Technical Studies Belgrade, and was processed in the SPSS software package. The research strategy included descriptive statistics, while the Likert scale was used to assess the satisfaction of the respondents. Analysis of variance and independent-sample t test were used to examine differences in opinions among different groups of respondents. The results of this study could be important for instructors, HEIs that operate in similar conditions, policymakers in the field of HE in Serbia, as well as for present and future research in this area.*

Keywords: *Distance education, students` opinions, undergraduate students, the analysis of variance*

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1. Introduction

Exploring the Internet there is a great number of HEIs that offer some form of distance education. Most of them have established distance learning (DL) in responding to changes in the external environment caused by the rapid growth of ICT. On the other hand, there are HEIs that were forced to change modality from traditional to DL because of circumstances caused by the COVID-19 pandemic (UNESCO, 2021). Most of the HEIs in Serbia belong to the second group.

Based on a learning theory and regardless of modality, students` opinions are very important for monitoring learning and teaching effectiveness (Gagne & Briggs, 1974, Gagne, 1985; Worthen & Sanders, 1987 cited in: Nguyen & Zhang, 2011), and consequently educational and institutional performance. This paper investigates first-year students` attitudes toward DL within three courses at the Department of Belgrade Polytechnic – The Academy of Applied Technical Studies Belgrade. It addresses the following research questions:

Q1: What are the students` opinions about the four dimensions of DL?
Q2: Are there some differences in opinions among different groups of respondents?

To obtain answers to these questions, descriptive statistics and analysis of variance were applied. The results of this study show that first-year students express positive attitudes toward dimensions of DL, as well as that there are no significant differences in opinions among different groups of respondents.

2. Theoretical background

2.1. Literature review

The DL is not a new way of education, some evidence date back to the beginning of the 20th century (Sadeghi, 2019; Meyer, 2002; Hanson et al., 1997, cited in Banjević et al., 2021), and some authors link its first form with the early 1800s (Kentnor, 2015; Verduin & Clark, 1991 cited in Tracey & Richey, 2005). However, most authors agree that DL has changed its forms under the influence of communications technologies development. The present idea of DL supported by advanced technology and the Internet can be traced back to late 1980s (Kentnor, 2015). Today, DL is an amazing tool that makes education accessible to everyone (Işik et al., 2010), regardless of age, distance from educational institutions, family and employment status, etc.

The theoretical background suggests numerous definitions of DL, but for this study DL is interpreted as a process of education where student and teacher are physically separated (Keegan, 2002 cited in: Fidalgo et al., 2020), and that is performed by different tools of ICT. Generally, there are two main types of DL – synchronous and asynchronous (Rao & Krishnan, 2015; Alam et al., 2012). The synchronous approach refers to online teaching that occurs at the same time for all participants while asynchronous DL promotes flexible time in accessing to course content via Internet (Fidalgo et al., 2020; Rao & Krishnan, 2015; Alam et al., 2012).

Students` attitudes (and perceptions) toward DL have been the subject of numerous studies, and findings have been varied. Exploring students` opinions about the positive and negative aspects of DL, Valenta et al. (2001, pp. 120) identified that ''ability to work from home'' was the most important determinant for students, while the ''phone line costs'' was unimportant. Roberts et al. (2005) developed an instrument to evaluate distance education using students` attitudes. They recognized the significance of the following dimensions of DL: ''learner–instructor interaction, learner–learner interaction, learner–content interaction, instructor, course organization, support services and administrative issues, facilitator, technical support, and

delivery method'' (pp. 58). In the study of Beaghan (2006), it was stated that students in DL were less satisfied with interaction with instructor than students who attended traditional courses. The students` attitudes may be varied by gender, for example, Işik et al. (2010, pp. 219) concluded that females had more positive attitudes and they felt ''more freely to express herself'' in DL than males. In addition, the authors emphasized that students found the DL was more effective and comfortable than traditional learning, but at the same time it was boring. Nguyen and Zhang (2011) pointed out that students expressed positive opinions about flexibility, but the most negative attitudes toward the lack of face-to-face communication. In the same study, students ''perceived having heavier workloads'' (pp. 35). Regarding flexibility of DL, similar results were obtained by Alam et al. (2012). The authors also indicated that appropriate course design, time of feedback from teacher to student, ''relevant instructional medium'' (pp. 515), and support system, were important determinants of students` satisfaction toward DL. Finally, Fidalgo et al. (2020) in their multinational study found that students` perception of DL varied across the observed countries. The study confirmed conclusions from previous research – the positive effect of flexibility, difficulties in communication and interactions, lack of discipline, importance of preconditions in the sense of students` skills and behaviour and raised some new issues addressed to students` motivation.

Two things are common in these studies: 1) flexible time management has been always evaluated positively; 2) communication and interactions have been negative aspects of DL, from students` point of view.

2.2. Distance learning in Serbia

According to legislation on HE in Serbia, there has been the possibility of introducing DL within the traditional HEIs since 2007. In the period 2007-2019, 18 academic HEIs accredited 52 study programmes of DL and 10 professional HEIs obtained accreditations for 13 study programmes (NEAQA, 2021). At the moment, 7 academic and 3 professional HEIs offer 18 and 3 study programmes of DL, respectively (NEAQA, 2021). During the 2020 and 2021, just 3 academic HEIs accredited 3 study programmes and one professional HEI obtained accreditation for one study programme of DL. The total number of HEIs in Serbia is 246, and 3092 study programmes (NEAQA, 2021). The data refer to decreasing trend in establishing distance learning in HEIs in Serbia over the last 5 years.

In the first year of the COVID-19 pandemic, all HEIs in Serbia worked in the DL modality, combining synchronous and asynchronous types. During the 2020/2021 and 2021/2022 academic years, the Department of Belgrade Polytechnic has performed blended learning. Blended learning can be defined as a combination of ''classroom time'' and DL (Garrison & Kanuka, 2004 cited in: Fidalgo et al., 2020). In the mentioned institution, blended learning has included distance synchronous/asynchronous teaching, classroom exercises in some courses, office hours, traditional colloquia, seminars and exams.

Exploring the field of student attitudes toward DL in Serbia there is an insufficient number of articles. The findings of this study could be important for future research, as well as for policy makers and practitioners in the field of HE.

3. Method

Population and sample size: The population involved 309 first-year students enrolled in the 2021/2022 academic year, within three courses that were studied at seven study programmes. The sample size included 183 students, which represented 59.22% of the population, thus

representativeness is satisfied. The margin of error for mentioned sample size, and 95% confidence level, was 4,65%. The real value was within ±4.65% of the measured value.

Data collection tool: As a research instrument, the questionnaire was developed and conducted via Google form. The questions were related to demographic information (year of study, field of study, age, gender, employment status) and four dimensions of DL – fulfilment of preconditions, organization and realization of instructions, advantages/disadvantages of DL, communication and social interactions. Some questionnaire items were designed with multiple choices, and student attitudes were measured by a five-point Likert scale (1- strongly disagree to 5 – strongly agree).

Analysis of questionnaire data: Obtained data was processed in the IBM SPSS Statistics 23.0 program. Analyses were performed by applying descriptive statistics and analysis of variance (ANOVA and independent-sample t test).

4. Results analysis

The sample size of 183 respondents included different groups of first-year students divided by age, gender, employment status and study programme. Table 1 and Table 2 show the distribution of sample size by mentioned demographic data.

Table 1. Distribution by gender, age and employment status

	Gender			**Age**			**Employment status**	
	Female	Male	Unspecified	18-20	21-25	Older than 25	Employed	Unemployed
N	130	52	1	153	22	8	29	154
%	71.04	28.42	0.54	83.61	12.02	4.37	15.85	84.15

Source: Authors (2022)

Table 2. Distribution by study programmes

	SP1	**SP2**	**SP3**	**SP4**	**SP5**	**SP6**	**SP7**
N	51	29	22	44	4	31	2
%	27.87	15.85	12.02	24.04	2.19	16.94	1.09

SP1 – Graphic Design; SP2 – Design of Industrial Products; SP3 – Fashion Design of Leather Goods; SP4 – Occupational Health and Safety; SP5 – Graphic Technology; SP6 – Quality Management; SP7 – Recycling Technologies

Source: Authors (2022)

Table 1 shows that most of the respondents are female (71.04%); 83.61% are aged between 18 and 20 years, i.e. students who directly continue education after high school that is usual in Serbia; most of the respondents are unemployed (84.15%), which is expected because in Serbia work and study is not practised in large-scale. Distribution by study programme (Table 2) indicates that more than one-half of the respondents study Graphic Design and Occupational Health and Safety study programmes (27.87% and 24.04%, respectively).

Research question one was to determine student opinions about the four dimensions of DL. The first dimension was related to the fulfilment of preconditions and included the following variables: *the accessibility of a quiet place at home for learning; the device used for performing DL; the accessibility of a home computer; the accessibility of internet connection at home; the students` digital skills and knowledge of the foreign language required for DL*. Table 3 and Table 4 present the students` responses.

Table 3. The fulfilment of preconditions for DL

	Frequency	Percent
The accessibility of a quiet place at home for learning		
Yes	112	61.2
No	4	2.19
Sometimes not	67	36.61
The device used for performing DL		
Own computer (lap-top, tablet)	139	75.96
Mobile phone	44	24.04
Computers in the Academy Library	/	/
Other	/	/
The accessibility of a home computer		
Yes	141	77.10
Sometimes not	33	18.03
No, because I don`t have a computer	9	4.92
The accessibility of internet connection at home		
I don`t have internet at home	1	0.5
Mostly I have problem with internet connection	15	8.2
Mostly I don`t have problem with internet connection	118	64.5
I don`t have problem with internet connection	49	26.8

Source: Authors (2022)

Table 4. The fulfilment of preconditions for DL

	N	Min.	Max.	Mean	SD
The students` digital skills	183	2	5	4.38	.716
Knowledge of the foreign language required for DL	183	1	5	4.22	.959

Source: Authors (2022)

The results (Table 3) indicated that almost two-thirds of the respondents (61.2%) had a quiet place at home for learning, 2.19% sometimes had, while 36.61% did not have. Most of the respondents (77.10%) had access to home computer at any time, 18.03% sometimes did not have, while only 4.92% of them did not have access because they did not have a computer. It is interesting that no one used a computer in the Academy library, students used their own computers (75.96%) and mobile phones (24.04%). Approximately 91.3% of the respondents did not have problems with internet connection at home, while 8.20% often had problems and just one respondent (0.5%) did not have internet access at home. The respondents evaluated their digital skills as ''very good'' (M=4.38, SD=0.716), as well as their knowledge of foreign language (M=4.22, SD=0.959), as shown in the Table 4.

The second analysed dimension was ''organisation and realisation of instructions'', which was considered through 10 variables presented in Table 5.

Table 5. Student attitudes toward organisation and realisation of instructions

	N	Min.	Max.	Mean	SD
Organisation and realisation of instructions	183	2	5	4.21	.671
Platform and tools are adapted to the course content (V1)	183	1	5	4.27	.784
The course obligations are comprehensible (V2)	183	1	5	4.31	.934
Asynchronous lectures are available in timely manner and they are in accordance with teaching plan (V3)	183	2	5	4.54	.724
Asynchronous lectures are helpful (V4)	183	1	5	4.38	.905
Asynchronous lectures are comprehensible (V5)	183	1	5	4.25	.889
Case studies/practical samples/analyses are helpful in understanding course content (V6)	183	1	5	4.23	.956
Organisation of instructions meet my expectations (V7)	183	1	5	3.89	1.079
Preparing colloquia and tests are not difficult (V8)	183	1	5	3.80	1.160
Learning materials are sufficient for preparation colloquia/tests/exams (V9)	183	1	5	4.00	1.074
Learning materials for preparation colloquia/tests/exams are available in timely manner (V10)	183	1	5	4.48	.838
Valid N (listwise)	183				

Source: Authors (2022)

Table 5 shows that there are no significant differences in mean values among observed variables. Generally, students express positive attitudes toward organisation and realisation of instructions (M=4.21, SD=0.671), that is in line with findings conducted by Alam et al. (2012) and Roberts et al. (2005).

The DL has its advantages and disadvantages that have been the focus of many authors. This study examined 11 variables under the dimension ''advantages/disadvantages of DL''. Table 6 presents descriptive statistics of mentioned variables.

Table 6. Student attitudes toward advantages/disadvantages of DL

	N	Min	Max	Mean	SD
Have more material to learn in order to cope course content (V11)	183	1	5	3.34	1.290
Learning is difficult because lack of chance to ask instant questions (V12)	183	1	5	3.23	1.328
Missing the chance for self-assessment (comparison of performance with classmates) (V13)	183	1	5	3.26	1.385
Missing the instructor ''live speech'' (V14)	183	1	5	4.18	1.184
Missing the ''live'' discussion, teacher and classmates opinions (V15)	183	1	5	4.11	1.173
Requires high level of self-discipline (V16)	183	1	5	4.15	1.112
Requires active learning and initiative (V17)	183	1	5	4.28	.849
Requires more time to learn materials (V18)	183	1	5	3.83	1.253
Saves costs (transport, accommodation, meals, etc.) (V19)	183	1	5	3.77	1.411

	N	Min	Max	Mean	SD
Flexibility of class schedule (in the sense of time and place) (V20)	183	1	5	4.13	1.105
Improvement of digital skills (V21)	183	1	5	3.80	1.269
Valid N (listwise)	183				

Source: Authors (2022)

Results presented in Table 6 indicate that the respondents agree with both aspects of DL, positive and negative. Their attitudes toward variables V11-V13 are neutral (the average evaluation is ''neither agree nor disagree''). Concerning other variables (V14-V21) students agree with the statements. It is interesting that respondents don`t strongly agree with any of the advantages/disadvantages, neither in terms of flexibility and costs. Such results are very different from all mentioned studies in the literature review, and these issues could be the subject of future research.

The fourth dimension of DL was associated with information about the attitudes toward communication and social interactions. The descriptive statistics is shown in Table 7.

Table 7. Student attitudes toward communication and social interactions

	N	Min	Max	Mean	SD
Communication and social interactions	183	1	5	3.97	.726
The teacher provides information and feedback on time (V22)	183	1	5	3.96	1.096
The teacher is always available in terms of learning support (V23)	183	1	5	4.11	.939
There are no problems in communication and interactions with the classmates (V24)	183	1	5	3.56	1.357
I am satisfied with the cooperation with other students (V25)	183	1	5	3.95	1.212
Missing the friendship during the traditional classes (V26)	183	1	5	4.28	1.062
Valid N (listwise)	183				

Source: Authors (2022)

The obtained results show students` positive attitudes toward communication and interactions (M=3.97, SD=0.726). Compared to other variables, the mean value of V24 is slightly lower, but it is still in the range of ''agree''.

Research question two was to examine if differences in opinions existed among different groups of the respondents. The analysis of variance (ANOVA and independent-sample t test) was conducted for all variables of DL dimensions by subcategories – age, study programmes, employment status and gender, respectively. The homogeneity of variance was fulfilled in all variables (Pallant, 2009). For variables where p-value was smaller than 0.05, Brown-Forsythe test was applied, and showed that the condition of homogeneity was fulfilled. The ANOVA analysis showed that there were no statistically significant differences in opinions among subgroups by age and study programme. Analogously, the independent-sample t test was performed for the categories ''employment status'' and ''gender'', and also there were no statistically significant differences in attitudes among subgroups. The obtained results of ANOVA, independent-sample t test and homogeneity are shown in Appendix A Tables 8 to 25.

Conclusion

The DL based on the advanced ICT is not a new way of education for the great number of HEIs. Consequently, many authors have investigated student attitudes toward DL from different aspects. Most of them agree that flexible time management is a positive aspect of DL from students` point of view. On the other hand, student workload, communication and interactions with instructors and classmates are often negatively assessed. The findings of this study refer to some different conclusions.

Most of the respondents had all necessary preconditions for DL. In relation to other dimensions of DL – organization and realization of instructions, advantages/disadvantages of distance learning, communication and social interactions, students expressed positive opinions. It is interesting that there were no significant differences in mean values among mentioned variables – they were in the range ''agree/satisfied''. Unlike previous research mentioned in the theoretical background, respondents in this study did not point out the flexibility as an advantage, as well as workload as a disadvantage. Additionally, respondents evaluated communication and social interactions with instructors and classmates positively.

Until now, many authors have found that students` attitudes may vary in relation to gender, age, nationality, etc. (Beaghan, 2006; Işik et al., 2010; Nguyen and Zhang, 2011; Alam et al., 2012; Fidalgo et al. 2020). The findings of this study don`t confirm those conclusions.

Although the obtained results did not confirm some conclusions from earlier research, they could be useful for instructors, HEIs that operate in similar conditions, policymakers in the field of HE in Serbia, as well as for present and future studies in this area. It would be interesting, in some of future papers, to analyse and compare findings from this paper with results and conclusions of some studies from Western Balkans region.

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Appendix A

Tables 8 to 13 show fulfilment of the conditions for homogeneity of variance and the analysis of variance for the DL dimension ''organisation and realisation of instructions''.

Table 8. Test of Homogeneity of Variances – Organisation and realisation of instructions by age

	Levene Statistic	df1	df2	Sig.
V1	,968	2	180	,382
V2	1,144	2	180	,321
V3	4,763	2	180	,010
V4	1,360	2	180	,259
V5	,004	2	180	,996
V6	,256	2	180	,774
V7	,215	2	180	,806
V8	,507	2	180	,603
V9	4,565	2	180	,012
V10	1,956	2	180	,144

Source: Authors (2022)

Table 9. ANOVA – Variables of the organisation and realisation of instructions by age

		Sum of Squares	df	Mean Square	F	Sig.
V1	Between Groups	,173	2	,087	,140	,870
	Within Groups	111,707	180	,621		
	Total	111,880	182			
V2	Between Groups	1,000	2	,500	,570	,567
	Within Groups	157,864	180	,877		
	Total	158,863	182			
V3	Between Groups	1,909	2	,955	1,837	,162
	Within Groups	93,534	180	,520		
	Total	95,443	182			
V4	Between Groups	,656	2	,328	,398	,672
	Within Groups	148,327	180	,824		
	Total	148,984	182			
V5	Between Groups	,791	2	,396	,497	,609
	Within Groups	143,143	180	,795		
	Total	143,934	182			
V6	Between Groups	1,154	2	,577	,629	,534
	Within Groups	165,207	180	,918		
	Total	166,361	182			
V7	Between Groups	1,328	2	,664	,568	,568
	Within Groups	210,486	180	1,169		
	Total	211,814	182			
V8	Between Groups	2,324	2	1,162	,862	,424
	Within Groups	242,594	180	1,348		
	Total	244,918	182			
V9	Between Groups	3,146	2	1,573	1,369	,257
	Within Groups	206,854	180	1,149		
	Total	210,000	182			
V10	Between Groups	10,320	2	5,160	7,914	,101
	Within Groups	117,363	180	,652		

	Sum of Squares	df	Mean Square	F	Sig.
Total	127,683	182			

Source: Authors (2022)

Table 10. Test of Homogeneity of Variances – Organisation and realisation of instructions by study programme

	Levene Statistic	df1	df2	Sig.
V1	1,205	6	176	,306
V2	1,584	6	176	,154
V3	3,483	6	176	,053
V4	2,447	6	176	,057
V5	2,719	6	176	,065
V6	3,150	6	176	,056
V7	1,940	6	176	,077
V8	2,095	6	176	,056
V9	2,834	6	176	,052
V10	1,981	6	176	,071

Source: Authors (2022)

Table 11. ANOVA – Variables of the organisation and realisation of instructions by study programme

		Sum of Squares	df	Mean Square	F	Sig.
V1	Between Groups	3,499	6	,583	,947	,463
	Within Groups	108,380	176	,616		
	Total	111,880	182			
V2	Between Groups	8,024	6	1,337	1,560	,161
	Within Groups	150,840	176	,857		
	Total	158,863	182			
V3	Between Groups	4,956	6	,826	1,607	,148
	Within Groups	90,486	176	,514		
	Total	95,443	182			
V4	Between Groups	8,178	6	1,363	1,704	,123
	Within Groups	140,806	176	,800		
	Total	148,984	182			
V5	Between Groups	12,352	6	2,059	2,754	,064
	Within Groups	131,582	176	,748		
	Total	143,934	182			
V6	Between Groups	9,816	6	1,636	1,839	,094
	Within Groups	156,544	176	,889		
	Total	166,361	182			
V7	Between Groups	7,967	6	1,328	1,146	,337
	Within Groups	203,848	176	1,158		
	Total	211,814	182			
V8	Between Groups	9,542	6	1,590	1,189	,314
	Within Groups	235,376	176	1,337		
	Total	244,918	182			
V9	Between Groups	9,863	6	1,644	1,446	,200
	Within Groups	200,137	176	1,137		
	Total	210,000	182			

		Sum of Squares	df	Mean Square	F	Sig.
V10	Between Groups	2,781	6	,464	,653	,687
	Within Groups	124,902	176	,710		
	Total	127,683	182			

Source: Authors (2022)

Table 12. Independent Samples t-test - Variables of the organisation and realisation of instructions by employment status

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V1	Equal variances assumed	,564	,454	1,010	181	,314	,158	,157	-,151	,467
	Equal variances not assumed			1,136	46,669	,262	,158	,139	-,122	,438
V2	Equal variances assumed	4,044	,046	-1,540	181	,125	-,286	,186	-,653	,080
	Equal variances not assumed			-1,269	35,632	,212	-,286	,226	-,744	,171
V3	Equal variances assumed	,000	,987	-,338	181	,736	-,049	,145	-,335	,237
	Equal variances not assumed			-,336	40,970	,738	-,049	,146	-,343	,245
V4	Equal variances assumed	,136	,712	-,509	181	,611	-,092	,181	-,449	,265
	Equal variances not assumed			-,542	43,888	,590	-,092	,170	-,435	,250
V5	Equal variances assumed	,215	,643	-1,894	181	,060	-,334	,176	-,682	,014

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
	Equal variances not assumed			-1,820	39,745	,076	-,334	,184	-,705	,037
V6	Equal variances assumed	,872	,352	-,602	181	,548	-,115	,191	-,492	,262
	Equal variances not assumed			-,679	46,926	,500	-,115	,169	-,456	,226
V7	Equal variances assumed	2,920	,089	-1,621	181	,107	-,348	,214	-,771	,075
	Equal variances not assumed			-1,520	38,951	,137	-,348	,229	-,811	,115
V8	Equal variances assumed	,337	,562	-1,050	181	,295	-,243	,232	-,700	,214
	Equal variances not assumed			-1,048	41,108	,301	-,243	,232	-,712	,225
V9	Equal variances assumed	,021	,884	-1,492	181	,137	-,319	,214	-,741	,103
	Equal variances not assumed			-1,646	45,631	,107	-,319	,194	-,709	,071
V10	Equal variances assumed	9,748	,002	-1,781	181	,077	-,296	,166	-,624	,032
	Equal variances not assumed			-1,479	35,790	,148	-,296	,200	-,702	,110

Source: Authors (2022)

Table 13. Independent Samples t-test - Variables of the organisation and realisation of instructions by gender

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
V1	Equal variances assumed	,428	,514	,358	180	,721	,046	,129	-,208	,301
	Equal variances not assumed			,366	98,631	,715	,046	,126	-,204	,296
V2	Equal variances assumed	,195	,659	1,356	180	,177	,208	,153	-,094	,510
	Equal variances not assumed			1,353	93,550	,179	,208	,153	-,097	,512
V3	Equal variances assumed	1,594	,208	-,678	180	,499	-,081	,119	-,316	,154
	Equal variances not assumed			-,714	105,332	,477	-,081	,113	-,305	,144
V4	Equal variances assumed	2,418	,122	-1,009	180	,314	-,150	,149	-,443	,143
	Equal variances not assumed			-1,080	109,473	,282	-,150	,139	-,425	,125
V5	Equal variances assumed	4,986	,027	-1,748	180	,082	-,254	,145	-,540	,033
	Equal variances not assumed			-1,992	127,325	,049	-,254	,127	-,506	,002

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
V6	Equal variances assumed	,057	,812	-,562	180	,575	-,088	,157	-,399	,222
	Equal variances not assumed			-,570	96,936	,570	-,088	,155	-,396	,219
V7	Equal variances assumed	2,691	,103	,152	180	,880	,027	,177	-,323	,377
	Equal variances not assumed			,142	82,297	,888	,027	,190	-,351	,405
V8	Equal variances assumed	2,456	,119	,484	180	,629	,092	,191	-,284	,469
	Equal variances not assumed			,462	85,529	,645	,092	,200	-,305	,490
V9	Equal variances assumed	,066	,798	-,348	180	,728	-,062	,177	-,410	,287
	Equal variances not assumed			-,347	93,272	,729	-,062	,177	-,414	,291
V10	Equal variances assumed	,075	,785	-,418	180	,676	-,058	,138	-,330	,215
	Equal variances not assumed			-,422	95,847	,674	-,058	,137	-,329	,214

Source: Authors (2022)

Tables 14 to 19 show fulfilment of the conditions for homogeneity of variance and the analysis of variance for the dimension ''advantages/disadvantages of DL''.

Table 14. Test of Homogeneity of Variances – Advantages/disadvantages of DL by age

	Levene Statistic	df1	df2	Sig.
V11	,553	2	180	,576
V12	,968	2	180	,382
V13	,542	2	180	,583
V14	2,086	2	180	,127
V15	,134	2	180	,874
V16	,076	2	180	,927
V17	,024	2	180	,976
V18	,949	2	180	,389
V19	4,014	2	180	,060
V20	2,040	2	180	,133
V21	1,537	2	180	,218

Source: Authors (2022)

Table 15. ANOVA – Variables of the advantages/disadvantages of DL by age

		Sum of Squares	df	Mean Square	F	Sig.
V11	Between Groups	1,614	2	,807	,482	,618
	Within Groups	301,380	180	1,674		
	Total	302,995	182			
V12	Between Groups	5,248	2	2,624	1,496	,227
	Within Groups	315,649	180	1,754		
	Total	320,896	182			
V13	Between Groups	,683	2	,342	,177	,838
	Within Groups	348,245	180	1,935		
	Total	348,929	182			
V14	Between Groups	,784	2	,392	,277	,758
	Within Groups	254,265	180	1,413		
	Total	255,049	182			
V15	Between Groups	5,742	2	2,871	2,111	,124
	Within Groups	244,848	180	1,360		
	Total	250,590	182			
V16	Between Groups	,008	2	,004	,003	,997
	Within Groups	225,008	180	1,250		
	Total	225,016	182			
V17	Between Groups	,014	2	,007	,010	,990
	Within Groups	131,210	180	,729		
	Total	131,224	182			
V18	Between Groups	,366	2	,183	,115	,891
	Within Groups	285,383	180	1,585		
	Total	285,749	182			
V19	Between Groups	9,428	2	4,714	2,404	,093
	Within Groups	352,933	180	1,961		
	Total	362,361	182			
V20	Between Groups	2,114	2	1,057	,865	,423
	Within Groups	219,995	180	1,222		
	Total	222,109	182			

		Sum of Squares	df	Mean Square	F	Sig.
V21	Between Groups	2,735	2	1,367	,848	,430
	Within Groups	290,183	180	1,612		
	Total	292,918	182			

Source: Authors (2022)

Table 16. Test of Homogeneity of Variances – Advantages/disadvantages of DL by study programme

	Levene Statistic	df1	df2	Sig.
V11	,814	6	176	,561
V12	,665	6	176	,678
V13	,341	6	176	,914
V14	,838	6	176	,542
V15	,596	6	176	,733
V16	1,627	6	176	,142
V17	2,122	6	176	,053
V18	1,010	6	176	,421
V19	1,777	6	176	,106
V20	1,914	6	176	,081
V21	1,188	6	176	,315

Source: Authors (2022)

Table 17. ANOVA – Variables of the advantages/disadvantages of DL by study programme

		Sum of Squares	df	Mean Square	F	Sig.
V11	Between Groups	39,890	6	6,648	4,447	,060
	Within Groups	263,104	176	1,495		
	Total	302,995	182			
V12	Between Groups	32,478	6	5,413	3,303	,054
	Within Groups	288,418	176	1,639		
	Total	320,896	182			
V13	Between Groups	24,032	6	4,005	2,170	,068
	Within Groups	324,897	176	1,846		
	Total	348,929	182			
V14	Between Groups	8,419	6	1,403	1,001	,426
	Within Groups	246,630	176	1,401		
	Total	255,049	182			
V15	Between Groups	12,378	6	2,063	1,524	,173
	Within Groups	238,213	176	1,353		
	Total	250,590	182			
V16	Between Groups	7,359	6	1,227	,992	,432
	Within Groups	217,657	176	1,237		
	Total	225,016	182			
V17	Between Groups	2,217	6	,370	,504	,805
	Within Groups	129,007	176	,733		
	Total	131,224	182			
V18	Between Groups	10,300	6	1,717	1,097	,366
	Within Groups	275,449	176	1,565		
	Total	285,749	182			
V19	Between Groups	32,177	6	5,363	2,859	,211

		Sum of Squares	df	Mean Square	F	Sig.
	Within Groups	330,183	176	1,876		
	Total	362,361	182			
V20	Between Groups	8,601	6	1,434	1,182	,318
	Within Groups	213,508	176	1,213		
	Total	222,109	182			
V21	Between Groups	13,170	6	2,195	1,381	,225
	Within Groups	279,748	176	1,589		
	Total	292,918	182			

Source: Authors (2022)

Table 18. Independent Samples t-test - Variables of the advantages/disadvantages of DL by employment status

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V11	Equal variances assumed	,491	,484	,438	181	,662	,113	,258	-,396	,623
	Equal variances not assumed			,458	43,014	,649	,113	,247	-,385	,611
V12	Equal variances assumed	1,259	,263	,443	181	,658	,118	,266	-,407	,642
	Equal variances not assumed			,476	44,351	,636	,118	,247	-,380	,615
V13	Equal variances assumed	,081	,776	,330	181	,742	,092	,277	-,455	,638
	Equal variances not assumed			,319	39,977	,751	,092	,287	-,488	,671
V14	Equal variances assumed	1,046	,308	,605	181	,546	,143	,237	-,324	,610

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
	Equal variances not assumed			,662	45,278	,511	,143	,216	-,292	,578
V15	Equal variances assumed	,147	,701	,264	181	,792	,062	,235	-,401	,526
	Equal variances not assumed			,259	40,447	,797	,062	,240	-,422	,546
V16	Equal variances assumed	1,269	,261	,821	181	,413	,182	,222	-,256	,621
	Equal variances not assumed			,856	42,918	,397	,182	,213	-,247	,612
V17	Equal variances assumed	,004	,951	,816	181	,415	,139	,170	-,196	,473
	Equal variances not assumed			,845	42,591	,403	,139	,164	-,192	,469
V18	Equal variances assumed	3,343	,069	,331	181	,741	,083	,251	-,412	,578
	Equal variances not assumed			,290	37,100	,773	,083	,286	-,496	,662
V19	Equal variances assumed	,001	,980	,974	181	,331	,275	,282	-,281	,831
	Equal variances not assumed			,973	41,120	,336	,275	,282	-,295	,845

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V20	Equal variances assumed	,005	,947	,583	181	,561	,129	,221	-,307	,565
	Equal variances not assumed			,597	42,181	,553	,129	,216	-,306	,564
V21	Equal variances assumed	,376	,541	-,487	181	,627	-,124	,254	-,624	,377
	Equal variances not assumed			-,550	46,926	,585	-,124	,225	-,576	,329

Source: Authors (2022)

Table 19. Independent Samples t-test - Variables of the advantages/disadvantages of DL by gender

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V11	Equal variances assumed	,365	,546	-,163	180	,871	-,035	,213	-,455	,385
	Equal variances not assumed			-,165	96,710	,869	-,035	,210	-,451	,382
V12	Equal variances assumed	,677	,412	-1,767	180	,079	-,381	,216	-,806	,044

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
	Equal variances not assumed			-1,865	105,912	,065	-,381	,204	-,786	,024
V13	Equal variances assumed	6,496	,012	-1,797	180	,074	-,404	,225	-,847	,040
	Equal variances not assumed			-2,001	120,413	,048	-,404	,202	-,803	,004
V14	Equal variances assumed	4,263	,040	-,732	180	,465	-,142	,194	-,526	,241
	Equal variances not assumed			-,814	120,209	,417	-,142	,175	-,488	,204
V15	Equal variances assumed	1,337	,249	-,100	180	,921	-,019	,193	-,400	,362
	Equal variances not assumed			-,106	108,966	,915	-,019	,181	-,377	,339
V16	Equal variances assumed	,005	,942	,294	180	,769	,054	,183	-,307	,415
	Equal variances not assumed			,292	92,228	,771	,054	,185	-,313	,420
V17	Equal variances assumed	,011	,918	,415	180	,679	,058	,139	-,217	,332
	Equal variances not assumed			,418	95,545	,677	,058	,138	-,216	,332

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
V18	Equal variances assumed	1,817	,179	-,661	180	,509	-,135	,204	-,536	,267
	Equal variances not assumed			-,693	104,164	,490	-,135	,194	-,520	,251
V19	Equal variances assumed	,005	,942	,083	180	,934	,019	,232	-,439	,478
	Equal variances not assumed			,083	94,295	,934	,019	,232	-,441	,480
V20	Equal variances assumed	,373	,542	1,381	180	,169	,250	,181	-,107	,607
	Equal variances not assumed			1,350	89,748	,180	,250	,185	-,118	,618
V21	Equal variances assumed	8,343	,004	1,351	180	,178	,281	,208	-,129	,691
	Equal variances not assumed			1,243	79,980	,217	,281	,226	-,169	,730

Source: Authors (2022)

Tables 20 to 25 show fulfilment of the conditions for homogeneity of variance and the analysis of variance for DL dimension ''communication and social interactions''.

Table 20. Test of Homogeneity of Variances – Communication and social interactions by age

	Levene Statistic	df1	df2	Sig.
V22	2,825	2	180	,062
V23	,519	2	180	,596
V24	,088	2	180	,916
V25	1,411	2	180	,246
V26	2,713	2	180	,069

Source: Authors (2022)

Table 21. ANOVA – Variables of the communication and social interactions by age

		Sum of Squares	df	Mean Square	F	Sig.
V22	Between Groups	6,076	2	3,038	2,571	,079
	Within Groups	212,656	180	1,181		
	Total	218,732	182			
V23	Between Groups	1,025	2	,512	,578	,562
	Within Groups	159,565	180	,886		
	Total	160,590	182			
V24	Between Groups	,344	2	,172	1,093	,912
	Within Groups	334,683	180	1,859		
	Total	335,027	182			
V25	Between Groups	3,014	2	1,507	1,026	,361
	Within Groups	264,440	180	1,469		
	Total	267,454	182			
V26	Between Groups	20,438	2	10,219	9,954	,061
	Within Groups	184,786	180	1,027		
	Total	205,224	182			

Source: Authors (2022)

Table 22. Test of Homogeneity of Variances – Communication and social interactions by study programme

	Levene Statistic	df1	df2	Sig.
V22	5,122	6	176	,081
V23	1,677	6	176	,129
V24	,549	6	176	,770
V25	1,189	6	176	,314
V26	2,760	6	176	,094

Source: Authors (2022)

Table 23. ANOVA – Variables of the communication and social interactions by study programme

		Sum of Squares	df	Mean Square	F	Sig.
V22	Between Groups	51,734	6	8,622	9,087	,600
	Within Groups	166,999	176	,949		
	Total	218,732	182			
V23	Between Groups	14,985	6	2,498	3,019	,068
	Within Groups	145,605	176	,827		
	Total	160,590	182			

		Sum of Squares	df	Mean Square	F	Sig.
V24	Between Groups	26,305	6	4,384	2,499	,074
	Within Groups	308,723	176	1,754		
	Total	335,027	182			
V25	Between Groups	15,044	6	2,507	1,748	,112
	Within Groups	252,410	176	1,434		
	Total	267,454	182			
V26	Between Groups	9,185	6	1,531	1,374	,227
	Within Groups	196,039	176	1,114		
	Total	205,224	182			

Source: Authors (2022)

Table 24. Independent Samples t-test - Variables of the communication and social interactions by employment status

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V22	Equal variances assumed	,584	,446	,208	181	,835	,046	,219	-,387	,479
	Equal variances not assumed			,216	42,651	,830	,046	,212	-,381	,473
V23	Equal variances assumed	,095	,758	-1,373	181	,172	-,257	,187	-,626	,112
	Equal variances not assumed			-1,437	43,070	,158	-,257	,179	-,617	,104
V24	Equal variances assumed	,060	,807	-,424	181	,672	-,115	,272	-,651	,421
	Equal variances not assumed			-,424	41,231	,674	-,115	,271	-,663	,433
V25	Equal variances assumed	1,441	,232	-1,716	181	,088	-,413	,241	-,888	,062

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V26	Equal variances not assumed			-1,559	38,038	,127	-,413	,265	-,949	,123
	Equal variances assumed	17,653	,000	-2,190	181	,030	-,459	,210	-,874	-,045
	Equal variances not assumed			-1,694	34,402	,099	-,459	,271	-1,010	,091

Source: Authors (2022)

Table 25. Independent Samples t-test - Variables of the communication and social interactions by gender

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
V22	Equal variances assumed	,591	,443	-,491	180	,624	-,088	,180	-,444	,267
	Equal variances not assumed			-,465	84,627	,643	-,088	,190	-,466	,289
V23	Equal variances assumed	,038	,846	-,224	180	,823	-,035	,155	-,340	,270
	Equal variances not assumed			-,226	95,635	,822	-,035	,153	-,339	,270

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
V24	Equal variances assumed	2,435	,120	1,316	180	,190	,292	,222	-,146	,731
	Equal variances not assumed			1,238	83,256	,219	,292	,236	-,177	,762
V25	Equal variances assumed	4,250	,041	,656	180	,513	,131	,199	-,263	,524
	Equal variances not assumed			,606	80,616	,546	,131	,216	-,299	,560
V26	Equal variances assumed	,015	,902	,378	180	,706	,065	,173	-,276	,407
	Equal variances not assumed			,384	97,160	,702	,065	,170	-,272	,403

Source: Authors (2022)