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Preliminary Results on the Online Lessons of IDPE Department of University of West Attica 2019-2020

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ABSTRACT

During the pandemic outbreak of COVID-19 in Greece that coincided with the spring semester of the year 2020, conventional face-to-face lessons presented a threat to public health. As a result, house confinement measures were taken. Universities, due to their offering either directly or via their lifelong education centers, were partially prepared to offer distant learning solutions for their students during the pandemic. The lessons, in the general case, were delivered in an ad hoc manner utilizing teachers' personal experiences and preferences creating some pressure on existing infrastructures. In the case of the Department of Industrial Design & Production Engineering at the University of West Attica, things were more organized than in the general case: there was a, more or less, uniform practice of preferring synchronous lessons and some monitoring was planned in order to evaluate the application for future reference. While data collected in the process are still going through statistical analysis there are some preliminary results that can be reported here.

KEYWORDS

COVID-19, Educational management, Emergency Online Education, Online Course Attendance, Online Course Design, Online Education, Student Attitudes, Synchronous Lessons

INTRODUCTION

The conditions the pandemic of COVID-19 created these past three years were unique but introduced a possibly permanent, or at least recurring, element in our lives from now on, that of house confinement and suspension of normal operations in various social contexts including schools and universities.

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While in schools limited experience with online learning and luck of infrastructures led to major issues with their ability to perform online on the part of teaching personnel and overshared resources, the conditions in universities created a discussion of a higher level.

Experience with digital media, platforms and pedagogy is not as rare among university teachers as it is in their secondary education counterparts. That is in part because of pressures towards tertiary institutions to provide a wider range of degrees to a larger number of people (FMITE 2014, Bates 2015). These pressures, combined with availability of technical and didactic expertise lead to tendencies towards online deliverance of traditional courses, courses that are structured as online from the start, online degrees that are based solely on online curricula and even online universities. One can even mention attempts to utilize virtual reality to simulate a traditional learning experience (Tsaramirsis et al., 2016).

Whether this is a good direction for tertiary education to move towards or not, the existence of both the tendencies and techno-educational solutions better prepared the field for a violent transition online than many others. Especially Departments related to Informatics, Computer Science, Communication Technology, Automation, Engineering, Media, Design, Molecular Biology, Biochemistry, Medical Informatics, etc., were prepared to an important extent for said transition.

That is not to say that university teachers did not toil to develop their online lessons, especially in cases that no part of them was already delivered online. The fruits of their labor were consumed by their students without a choice being involved due to pandemic conditions. Business and IT strategies have been aligned to some extend but their relative independence was magnified by the COVID-19 crisis (Dairo et al., 2021). What is more, for most universities' evaluation schemes (Hussein et al., 2017), online delivery was not directly addressed and thus data were not as thoroughly collected within the frame of self-evaluation as to be useful.

In order for the university teachers' product to be improved, information regarding student satisfaction or some other metric of success of their online courses became of the greatest importance. To retrieve such feedback new tools were needed in most cases, including tools specifically aimed at the evaluation of distant delivery. Universal and exclusive online delivery became the case for the University of West Attica overnight – a hasty transition that had no precedence and thus no available research to guide it.

The research in hand aimed to collect such information regarding nine (9) courses, almost uniformly spread in even semesters, delivered during the spring of 2020 for undergraduate students of the Industrial Design and Production Engineering Department, University of West Attica (hereafter IDPE and UniWA respectively).

BACKGROUND

IDPE offers a 5-year long undergraduate program that has gone through two major revisions during recent years. As a result, there are some residue students lingering in higher than 8th (J) semesters trying to fulfill the conditions for completing the new and, hopefully, improved program in order to attain the relevant title. We group these students with those of the last semester under the annotation J+ semester.

All students were required to take all their courses online during the spring semester of 2020 due to pandemic related state wise enforced closures and thus all academic staff had to migrate their courses online. There were neither technology readiness investigations, nor estimations on the appropriateness of technology acceptance (Godoe & Johansen, 2012). In fact, there was no time and no reason for a model of information technology acceptance among users (Dillon & Morris, 1996) to be used.

Before the pandemic there was room to debate whether higher education is the next industry to be seriously disrupted by the rapid pace of digital technology. Those who believe so (Barber, Donnelly, & Rizvi, 2013; Craig, 2015; Carey 2015) had to answer the critical analysis of others (Selwyn, 2013; Weller & Anderson, 2013). Moreover, while online education in higher education has continuously grown in the U.S. before the pandemic, about 70% of students were still taking exclusively residential courses (Seaman et al. 2018), a fact seriously limiting the scope of discussion.

During the pandemic some 160 countries implemented nationwide closures, impacting 87% of the worlds' student population (UNESCO 2020), dramatically changing both the emergency and the scope of the discussion (Makrygiannis et.al, 2019a). Universities were not excluded from the process; they had to hastily transfer all instruction online. In some cases, teaching staff was not experienced enough to handle the transition. Even where such experience was present, as with our own department, other factors tended to affect the process: for example, the time constraints. Time constraints meant, for one thing, that only OER and university proprietary material could be used with limited time available for technological pedagogical content knowledge (Mishra & Koehler 2006) adjustment to the manner of delivery (Makrygiannis et.al, 2019b). For another no traditional instructional design models such as ADDIE (Morrison, 2010; Dick & Carey, 2004), Dick and Carey' Systematic Design of Instruction (Dick et al. 2015) or AGILE (Douglas 2006) could be comfortably and fully applied.

While the first one could be argued to be in advantage of the teaching and learning process (Sandanayake, 2019) limitations of the kind did nothing to make the life of academic staff easier. On the contrary they added to known issues with distant education (Beaudoin, M. 2016) that demand specific considerations and a sound decision making process thus aggregating any problems with the relevant process.

Since course design is a key quality indicator in online learning (Valai et al. 2019) the second limitation posed a harder to handle problem. Of course, less rigid methods based on actual everyday practice have risen, even before the pandemic (see for example Bennett et al., 2017) and those were actually applicable under pandemic conditions (Lee 2021) equally in developing material, for the first iteration of changing the delivery mode, and in revising it. Course modularity was also helpful (Lightfoot, 2006; Makrygiannis et al., 2020). Even so, data was needed to discern students' satisfaction with the material and delivery both.

Yet, there were more than one instances of serving "old wine in new bottles" to use an expression from Bates (2015). Indeed, hastiness needs answer for quite a few cases of classroom-type online learning. Since, delivering the exact same design online, simply adding some technology in the mix, does not automatically result in meeting changing needs there was a question whether all online courses catered to the needs of students living in house confinement.

If we accept Quay's (2013) maxim that 'ways of being are ways of doing are ways of knowing' and his subsequent conclusion (in Peters et al., 2020) that ways of being are primary and knowing serves being, then this is not a minor question. There is no denying that some students actually struggle to find the time for their lessons, the synchronous ones most of all, even under confinement. Sometimes, especially then, when for example they are mothers or have children in general, when they do not enjoy highly digitized home environments and in many other cases (Lee et al., 2019).

The fact that academic staff lived under the exact same conditions during that period should not be overseen either. In fact moving teaching online involves revisions of existing content, assessment types and activities, augmenting demands on staff's time and also demands for educational management, already there when dealing with educational technology (Arnold & Sangrà, 2018). More over conditions did not allow for professional development and certainly not a self-paced one (Rhode, 2013). The need of support in the process of creating online courses identified by Marek (2009) gains prevalence under such conditions.

The teachers of a number of courses delivered in that first phase of the massive covid-inflicted transition wished for data on what did and did not work in that first application. These data would directly serve them in finetuning their courses and hopefully benefit their students in subsequent runs.

That was the occasion of the study in hand that included students of the Department of Industrial Design and Production Engineering of the University of West Attica, attending nine (9) courses from even semesters during the spring semester of 2020. The study was facilitated by the staff teaching the courses and was conducted by a team lead by the corresponding author. It was conducted in two distinct runs that included in the first iteration an attempt to identify factors of satisfaction and/ or positive attitudes amongst regular suspects and in the second study some less obvious yet present relations. The results of this second iteration will be presented in the next section.

THE STUDY AND ITS RESULTS

Identity of the Study and Methods

The major tools for the research at hand were two anonymous questioners administered to students of the Department of IDPE of the School of Engineering, University of West Attica.

The first questioner was delivered midterm and investigated usual suspects for multi-variant analysis, such as gender, financial background, familiarity with technology outside of the academic environment etc. in conjunction with attitudes towards online delivery in general and its continuance. It was presented to all attending one of the courses involved, was completed on a voluntary basis and although it had a larger sample produced almost no results. No correlation of any strength was identified; a surprising fact and a result on its own right meriting some further consideration.

The second questioner was the product of such a consideration and followed a different approach: it looked for correlations among semester of study, attendance, general impression of the distant lessons, and attitudes towards online delivery in general and its continuance. Furthermore, we included personal preference for continuing with remote delivery.

The fact that final exams were also delivered online and students that did not participate to distant lessons or did not participate regularly were allowed to participate offered a great opportunity: the attendance of our sample would variate through the whole spectrum. Moreover, it made for opponents of distant delivery to be willing to be more vocal.

A sample of 300 students was chosen randomly from exam participants. They were invited to participate in the electronic questioner while waiting for their identification. Of them 8 failed to properly complete the questioner – possibly a roundabout way to refuse or an indication of difficulties with technology. The rest went through statistical analysis to identify correlations and build a causal model. Table 1 presents the number of students by semester of study. The percentage roughly corresponds to the percentage of students in that semester in the general population.

That second part of our research and its results will be the focus point of this paper.

Results

The results of the second questioner will be presented in three parts. The first part will present tables and pies presenting the data and performing descriptive statistics on them. The second will present statistically significant differences in the answers of students depending on their characteristics – mainly semester of study and position on applicability of online delivery as it turns out. Finally, the third part will consist of identifying correlations and producing a partly exegetic model.

Descriptive Statistics

Table 2 informs us that a very significant percentage of the surveyed students (41.8%) stated that they attended all or almost all distance learning courses. Overall, the majority of students (70.5%)

Table 1. Participants' Semester of Study

Semester of study			
	Frequency	**Percentage**	**Cumulative Frequency**
B	70	24,0	24,0
D	87	29,8	53,8
F	51	17,5	71,2
H	23	7,9	79,1
J+	61	20,8	100,0
Sum	292	100,0	

stated that they attended relatively regularly, regularly or all the courses that took place remotely as we can clearly see in Fig.1.

As shown in Fig. 2 the general impression gained by the majority of students from the distance learning courses provided, shown in Table 3, is undoubtedly positive. Overall 75.7% of students have a positive and very positive impression of distance learning (12% Very positive).

As we can see in Fig. 3 the majority of students (57.2%) want to continue distance education as shown in Table 4. Respectively, in Fig. 4 we see 74% of the students wish to continue the distance education for a longer period of time (definitely yes or with conditions). It is pointed out that, as shown in Table 5, a significant percentage of students (18.8%) want distance education to continue as it is while the majority (55.1%) under certain conditions.

Statistically significant differences in the answers of students

Initially we notice that the students' answers differ based on the semester of study especially in terms of their general impression of the distance learning courses, whether they believe it could work for a longer period of time as well as whether they would like to continue.

Semester of Study and General Impression of Distant lessons

It is observed in Table 7 that the attitudes of students towards distance learning changes depending on the semester with a statistically significant difference χ^2 (4, N = 292) = 19.708, p <0.001) (unification

Figure 1. Attendance of distant lessons

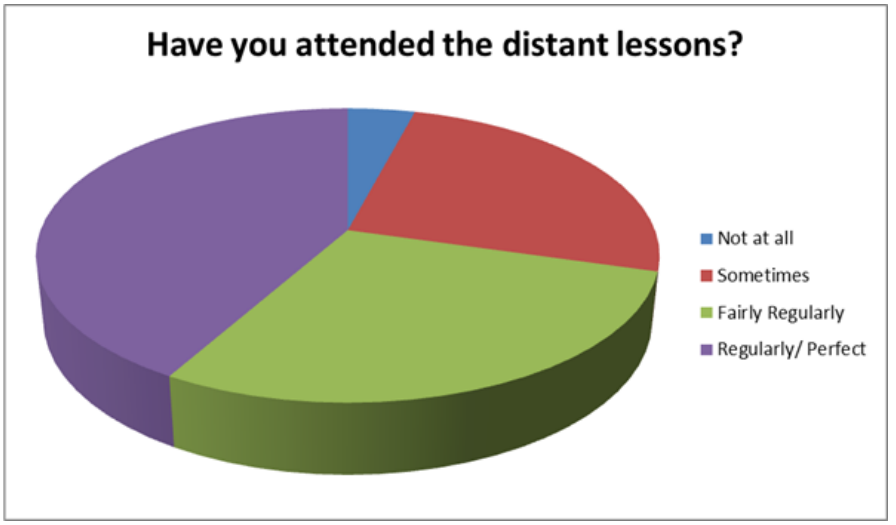

Table 2. Attendance of distant lessons

Attendance of distant lessons			
	Frequency	**Percentage**	**Cumulative Frequency**
Not at all	12	4,1	4,1
Sometimes	74	25,3	29,5
Fairly Regularly	84	28,8	58,2
Regularly/ Perfect	122	41,8	100,0
Sum	292	100,0	

Figure 2. General impression of distant lessons

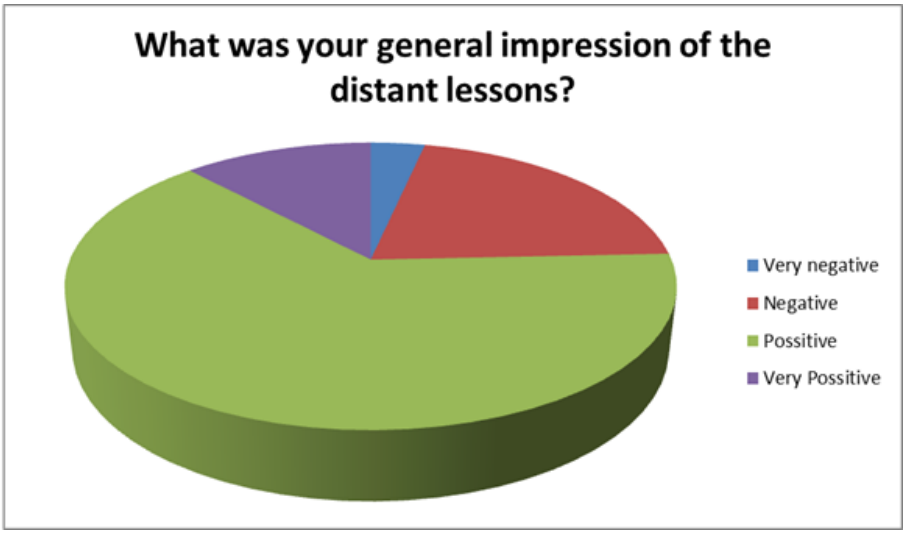

Table 3. General impression of distant lessons

General impression of Distant lessons			
	Frequency	Percentage	Cumulative Frequency
Very negative	10	3,4	3,4
Negative	61	20,9	24,3
Possitive	186	63,7	88,0
Very Possitive	35	12,0	100,0
Sum	292	100,0	

Figure 3. Attitude towards continuation of Distant lessons

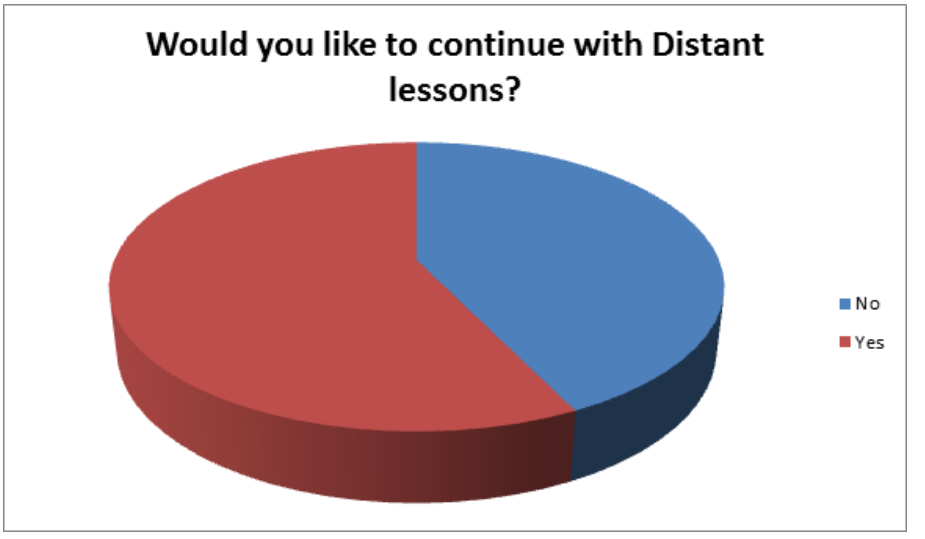

Figure 4. Applicability of Distance Learning for longer time frames

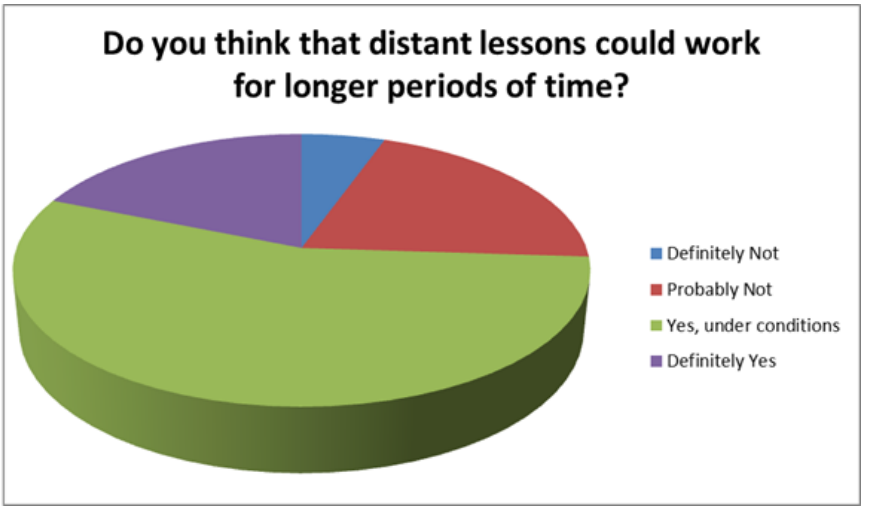

Table 4. Positive attitude towards the continuance of distant lessons

Positive attitude to continuance of Distant lessons		
	Frequency	**Percentage**
No	125	42,8
Yes	167	57,2
Sum	292	100,0

Table 5. Applicability of Distance Learning for longer time frames

Applicability of Distance Learning for longer time frames			
	Frequency	**Percentage**	**Cumulative Frequency**
Definitely Not	16	5,5	5,5
Probably Not	60	20,5	26,0
Yes, under conditions	161	55,1	81,2
Definitely Yes	55	18,8	100,0
Sum	292	100,0	

of subcategories very negative and negative attitude towards distance education) . Indicatively in Table 6: 38% of the second semester students and 21.8% of the fourth semester students have a negative impression of the distance learning courses and only 2.8% and 8.0% have a very positive impression.

On the contrary, for the students of higher semesters (J+, H, F), 23.3%, 13% and 17.6% have a very positive impression, respectively. Overall, 83.3% of the J+ semester students, 95.6% of the H semester students and 84.3% of the F semester have a positive and very positive impression towards distance education.

Table 6. Semester of Study and General impression of distant lessons

			Semester of Study					Sum
			B	D	F	H	J+	
General impression of Distant lessons	Very negative	Number of Students	2	4	3	0	1	10
		% General impression of lessons	20,0%	40,0%	30,0%	,0%	10,0%	100,0%
		% Semester	2,8%	4,6%	5,9%	,0%	1,7%	3,4%
	Negative	Number of Students	27	19	5	1	9	61
		% General impression of lessons	44,3%	31,1%	8,2%	1,6%	14,8%	100,0%
		% Semester	38,0%	21,8%	9,8%	4,3%	15,0%	20,9%
	Possitive	Number of Students	40	57	34	19	36	186
		% General impression of lessons	21,5%	30,6%	18,3%	10,2%	19,4%	100,0%
		% Semester	56,3%	65,5%	66,7%	82,6%	60,0%	63,7%
	Very Possitive	Number of Students	2	7	9	3	14	35
		% General impression of lessons	5,7%	20,0%	25,7%	8,6%	40,0%	100,0%
		% Semester	2,8%	8,0%	17,6%	13,0%	23,3%	12,0%
Sum		Number of Students	71	87	51	23	60	292
		% of Sum	24,3%	29,8%	17,5%	7,9%	20,5%	100,0%

Table 7. General impression and Semester of Study

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	19,708[a]	4	,001
Likelihood Ratio	20,798	4	,000
Linear-by-Linear Association	13,594	1	,000
N of Valid Cases	292		

Semester of Study and Applicability of Distance Learning for Longer Time Frames

Students' attitudes on whether distance education could work for a longer period of time also differ significantly according to the semester of study as shown in Table 10 with χ^2 (8, N = 292) = 20,120, p <0.010. (unification of subcategories Not at all- Sometimes Attendance of distant lessons). Indicatively, in Table 8: only 5.6% of the second semester students answer Definitely Yes in contrast to the 26.7% of the J + semester students, the 17.4% of the H semester and the 29.4% of the F semester. Overall, 76.7% of the students of J + semesters, 95.7% of the students of the H semester and 76.5% of the F semester definitely answer Yes or Yes with conditions that the distant delivery could work for a longer period of time.

Table 9 also clearly shows a tendency of higher attendance and also of lower abstention the higher the semester possibly related to the results of Table 8.

Attendance of Distant Lessons and Applicability for Longer Time Frames

Finally, we observe, in Tables 11 and 12, that there is a statistically significant difference between the distance education monitoring and the view on the operation of the distance education for a longer period $\chi 2$ (6, N = 292) = 20.036, p <0.003) (consolidation subcategories of Attendance of distant lessons Not at all-Sometimes).

Table 8. Semester of Study and Applicability of Distance Learning for longer time frames

			Semester of Study					Sums
Crosstab			**B**	**D**	**F**	**H**	**J+**	
Applicability of Distance Learning for longer time frames	Definitely Not	Number of Students	6	6	1	0	3	16
		% For longer time frames	37,5%	37,5%	6,3%	,0%	18,8%	100,0%
		% Semester	8,5%	6,9%	2,0%	,0%	5,0%	5,5%
	Probably Not	Number of Students	16	21	11	1	11	60
		% For longer time frames	26,7%	35,0%	18,3%	1,7%	18,3%	100,0%
		% Semester	22,5%	24,1%	21,6%	4,3%	18,3%	20,5%
	Yes, under conditions	Number of Students	45	44	24	18	30	161
		% For longer time frames	28,0%	27,3%	14,9%	11,2%	18,6%	100,0%
		% Semester	63,4%	50,6%	47,1%	78,3%	50,0%	55,1%
	Definitely Yes	Number of Students	4	16	15	4	16	55
		% For longer time frames	7,3%	29,1%	27,3%	7,3%	29,1%	100,0%
		% Semester	5,6%	18,4%	29,4%	17,4%	26,7%	18,8%
Sum		Number of Students	71	87	51	23	60	292
		% εκ του Συνόλου	24,3%	29,8%	17,5%	7,9%	20,5%	100,0%

Table 9. Semester of Study and attendance of distant lessons

		Semester					Sum
		B	**D**	**F**	**H**	**J+**	
Attendance of distant lessons	Not at all or Sometimes	30	19	18	6	13	86
	Fairly Regularly	18	36	8	6	16	84
	Regularly/ Perfect	23	32	25	11	31	122
Sum		71	87	51	23	60	292

Table 10. Chi-Square test

Chi-Square Tests			
	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	20,120[a]	8	,010
Likelihood Ratio	19,959	8	,010
Linear-by-Linear Association	6,499	1	,011
N of Valid Cases	292		

Correlations and model

We observe the following correlations regarding the attitudes of students towards distance education.

The general impression of the students from the courses that took place remotely is related to:

a) whether they would like to continue distance education $r = 0.486$, $p < 0.01$
b) their belief in distant lessons being appropriate for longer periods of time $r = 0.431$, $p < 0.01$
c) whether they attended distant courses $r = 0.372$, $p < 0.01$

Table 11. Attendance of distant lessons and Applicability for longer time frames

		Applicability of Distance Learning for longer time frames				Sums
		Definitely Not	Probably Not	Yes, under conditions	Definitely Yes	
Attendance of distant lessons	Not at all or Sometimes	9	27	40	10	86
	Fairly Regularly	3	15	52	14	84
	Regularly/ Perfect	4	18	69	31	122
Sums		16	60	161	55	292

Table 12. X^2 Attendance of distant lessons and Applicability for longer time frames

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	20,036[a]	6	,003
Likelihood Ratio	19,156	6	,004
Linear-by-Linear Association	16,285	1	,000
N of Valid Cases	292		

a. 2 cells (16,7%) have expected count less than 5. The minimum expected count is 4,60.

The attitude of students towards the continuation of distant delivery of courses is moderately related to their position on the applicability of distant courses for longer periods of time r=0,505, p<0.01 and weakly with their attendance of distant lessons r=0,245, p<0.01.

Their position on the applicability of distant courses for longer periods of time is also associated, even more weakly, with whether they have attended distance learning courses in the past $r = 0.203$, $p < 0.01$.

The general impression of the students from the courses that took place from a distance is also positively correlated with specific courses that they attended such as:

- DESIGN AND PROGRAMMING OF SUPPLY SYSTEMS (LOGISTICS) $r = 0.463$, $p < 0.01$,
- DESIGN AND PROGRAMMING OF INDUSTRIAL PRODUCTION SYSTEMS $r = 0.397$, $p < 0.01$,
- TRANSPORT SYSTEMS MANAGEMENT $r = 0.375$, $p < 0.05$, and
- DATA COLLECTION SYSTEMS - SENSORS $r = 0.305$, $p < 0.01$.

Respectively, the position of the students that distance education is adequate for longer periods of time is positively correlated with the courses:

- DESIGN AND PROGRAMMING OF SUPPLY SYSTEMS (LOGISTICS) $r = 0.544$, $p < 0.01$,
- DESIGN AND PROGRAMMING OF INDUSTRIAL PRODUCTION SYSTEMS $r = 0.399$, $p < 0.01$,
- DATA COLLECTION SYSTEMS - SENSORS $r = 0.346$, $p < 0.01$, and
- COMPUTER LABORATORY $r = 0.237$, $p < 0.05$ (weak correlation).

Regression Analysis

We observe a statistically significant correlation / prediction of the general impression of the students of the distance learning courses based on the semester of study and whether the students attended distance learning courses.

The correlation index between the variables is R = 0.453 and the predictive variable Adjusted R2 = 0.2 means that the variables semester and distance education are responsible for 20% of the change in the attitude of students to the general impression towards the lessons.

The forecast for the general impression of the students from the distant courses based on the semester of study and if the students attended distance courses will be in the form of:

General impression of distant lessons =

1,744 + 0.275 x (Attendance of Distance learning) + 0.093 x (Semester of Study)

The coding of variables here is as follows:

- General impression of distant lessons: Very Negative 1, Negative 2, Positive 3, Very Positive 4.
- Attendance of distant lessons: Not at all 1, Sometimes 2, Relatively regularly 3, Regularly/ Perfect 4.
- Semester of study: B 1, D 2, F 3, H 4, J+ 5. (Corresponding to the year of study)

Tables 13, 14 and 15 respectively present our model summary, the ANOVA results for the regression of the dependent variable on the two predictors and the actual coefficients for the predictors

Table 13. Model Summary

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	,453[a]	,206	,200	,595

a. Predictors: (Constant), Semester of Study, Attendance of distant lessons

Table 14. ANOVA

ANOVA[b]						
Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	26,469	2	13,234	37,393	,000[a]
	Residual	102,285	289	,354		
	Total	128,753	291			

a. Predictors: (Constant), Semester of Study, Attendance of distant lessons
b. Dependent Variable: General impression of distant lessons

Table 15. Coefficients

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	1,744	,132		13,207	,000
	Attendance of distant lessons	,275	,039	,376	7,101	,000
	Semester of Study,	,093	,024	,203	3,826	,000

a. Dependent Variable: General impression of distant lessons

CONCLUSION

One clear result is that higher semester students tend to see distant delivery under a more positive light (see *Tables* 6 and 8). That is presumably straightforwardly explainable with more practical considerations that present themselves with the progress of years, such as work and family demanding a share of a student's time and having enjoyed student life enough to be able to operate from outside campus. A slight correction was observed regarding returning students (being in the program for longer than its normal duration + 1 or two years and/ or returning from aν official interruption of studies). That trend is also easily explainable since these students need time to readapt to student life and orient themselves in a somewhat different environment in terms of courses and/ or subject matter.

Willingness to participate for longer periods of time seems also to contribute some to a positive spin in both the conviction of students that distant learning is overall positive and their general impression from the specific lessons, but not independently. On the contrary, it is attendance to distant lessons that contributes most, of the variables here, to a positive attitude towards the lessons; thus continuous recent experience seems indeed a major factor of satisfaction/ general impression.

Even so there is a major part of that general impression that we have not attributed to a specific contributor: that constant in our model is rather high. Since demographics have been more or less exhausted it seems we might have to look in other directions such as the quality, quantity and appropriateness of online materials, teachers' familiarity with online teaching, successful migration, and proper delivery. One might even consider investigating whether the choice for synchronous lessons was appropriate for IDPE students.

Another interesting result is that both students' general impression from the courses and their position on appropriateness for longer periods of time is, at least moderately, associated with specific courses. Three out of four are common in both cases and of those three:

- two are not heavily related with specific technologies and are not tightly connected with a laboratory even in "normal"- as in pre-covid – conditions. These are DESIGN AND PROGRAMMING OF SUPPLY SYSTEMS (LOGISTICS) and DESIGN AND PROGRAMMING OF INDUSTRIAL PRODUCTION SYSTEMS.
- the third, DATA COLLECTION SYSTEMS – SENSORS, is technical and related to specific sensor technologies and laboratorial practice, but was already partly delivered online (in the sense of material available that way, videos of lab processes produced prior to confinement, even studying remote labs as a mode of supplemental delivery) .

There is definitely reason for continuing our investigation. On one hand we need to determine the elusive factors. A full framework for the evaluation of distantly delivered university courses is still needed if we are to maintain such a mode of delivery, either fully or for a major part of academic lessons. On the other, after almost three years of remote delivery, it would be interesting to see the attitudes of students towards long term distant learning in the light of having actual experience with the condition and whether students in higher semesters now have changed their attitudes.

There was an increased number of absentees from semester H which might also warrant further study since it could hide a variation on the perception of distant learning in the students of that semester.

Furthermore there is a number of questions to address related to parts of teaching an engineer or a technologists where distant learning is not a best fit, at least not straightforwardly. For example a major part of their education is concerned with the application of knowledge and in such a context developing professional attitudes, technical and professional expertise, including skills, familiarity with the technical apparatus on one hand and best practices on the other. Handling that part from a distance is not obviously attainable if at all.

LIMITATIONS OF THE STUDY

The study works with perceived metrics and anonymous questioners. As a result there is no way to find out how the attitudes of students relate to their actual academic performance.

While it was designed specifically with IDPE in mind which might be limiting of its applicability outside of this scope, research has been carried out, outside of UniWA, with similar design (Makrygiannis, 2020). Alas much work was needed to migrate the design and a third attempt, on yet another environment that of post-secondary vocational training, was thwarted by time constrains.

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