

## STUDENT ACHIEVEMENTS AND THEIR ATTITUDES TOWARD COURSE DESIGN – A CORRELATION ANALYSIS

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**Abstract:** Besides the distance learning has existed for a long time, for the great number of Higher Education Institutions it was the “consequence” of Covid-19 pandemic. This was case of HE Sector in Serbia. In some earlier research, the authors of this paper considered students’ performance and their attitudes toward distance learning, separately. The main idea of this study is to investigate the correlation between student attitudes toward distance education and their achievements. The sample included students of The Academy of Applied Technical Studies Belgrade – Department of Belgrade Polytechnic, who attended different year of the same study programme. Students’ achievements were measured through GPA and average efficiency within courses of the first, second and third years of study programme. In this research, two instruments were used – questionnaire and data related to students’ scores. Research methods included descriptive statistics and correlation analysis. The obtained results could be useful for present and future research, improvements of educational process, instructors and stakeholders from this area.

**Keywords:** Distance learning, Students’ opinions, Students’ efficiency and effectiveness, Correlation analysis

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### 1. Introduction

The rapid growth of ICT and changes in society have caused the increasing application of digital technologies in the Higher Education sector (HE). The process of digitalization has had two directions – 1) application of digital technologies in traditional learning settings through implementation of different software and tools, and 2) introducing (or improving) of distance learning (DL), online teaching, e-learning and blended learning. For the great number of HE Institutions (HEI) establishing of distance learning was the planned activity as response to changes in the external environment. In Serbia, as well as in many other countries (UNESCO, 2021), the distance learning was the “consequence” of Covid-19 pandemic for most of HEIs.

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The traditional educational service is very specific in relation to other types of services, it is “intangible, heterogeneous, perishable”, and its uniqueness is also reflected in effectiveness that equally depends on student (as user) and instructor engagements (Shank et al., 1995 cited in Gruber et al., 2010, pp.5). This statement refers to the importance of student attitudes and consequently manifested behaviour in the process of learning and achieving academic performance. Regarding the specificity of distance learning environment that “break the existing unified planning situation and provide an absolute, interactive, flexible teaching system” (Ma, Yao & Liu, 2017, pp. 2188), in the literature some questions have been raised. These questions are related to consistency between student attitudes toward distance learning and their achievements, factors that affect student attitudes, as well as DL, student academic performance in DL versus onsite learning, etc.

Student attitudes are in function of internal and external factors. Internal factors imply on personal characteristics, motivational beliefs and intrinsic processes (Radovan & Makovec, 2015; Liu, 2016; Aguilera-Hermida, 2020 cited in: Nurlianti, 2022; Nurlianti, 2022). The external factors are related to circumstances and processes from external environment, such as fulfilment of necessary preconditions for DL; adaptability of course design; quality of interactions among students, as well as student-instructor, support services, technical support, delivery method; student workload; time of feedback, etc. (see: Demir Kaymak and Horzum, 2022; Banjević et al., 2022).

Positive or negative attitudes affect to student behaviour that is crucial for achieving learning outcomes. Some authors found that positive attitudes produce better achievements. For example, Campbell, Floyd and Sheridan (2002) compared student performance and attitudes for courses taught online versus onsite. In this study, students expressed positive attitudes toward online course and they performed better exam results than onsite students. The study conducted by Erdogan, Bayram and Deniz (2008) highlighted the positive effect of web-based education on student attitudes and academic achievement. Ma, Yao and Liu (2017) examined correlation between learning effectiveness and online learning behaviour within three courses (“Management Principles”, “Advanced Mathematics” and “Data Structure”). For all mentioned courses, the authors found high positive correlation between online learning behaviour and academic performance. By considering students’ perception on Intermediate Listening course supported by two online platforms, Nurlianti (2022) referred to importance of motivation and personal responsibility in improving listening skills, and “strong positive correlation between students’ perception and students’ achievement”.

Contrary to previous considerations, not all studies confirmed positive correlation between student attitudes and academic achievements (Fernandes et al., 2022; Ahmad et al., 2017).

## **2. Research idea**

In some earlier research, the authors of this paper considered students’ academic performance (traditional vs DL settings) and their attitudes toward distance learning, separately. In the first case, there were not statistically significant differences in student achievements between traditional and distance learning (Banjević et al., 2021). According to student attitudes toward DL, the authors found that students expressed positive opinions about all variables related to DL (“organization and realization of instructions”, “advantages/disadvantages of distance learning”, “communication and social interactions”). Moreover, student attitudes did not vary among different demographic groups (Banjević, 2022).

As previous conclusions are contrary to findings of other research, in this study the authors investigate correlation between student attitudes toward DL and their academic performance

during one academic year. According to objective, the paper addresses the following research question:

RQ: Is there any statistically significant correlation between student attitudes toward course design and GPA i.e., efficiency?

The data were collected at The Academy of Applied Technical Studies Belgrade – Department of Belgrade Polytechnic.

### 3. Method

The population consisted of 60 students within three years of the study programme “Quality Management” in 2021/2022 academic year. The sample size included 43 active students. For the confidence level 95% the margin of error was 8.02%. The real value is within  $\pm 8.02\%$  of the measured value.

In this study the following instruments were applied: 1) questionnaire for the purpose of collecting data related to student attitudes (see: Banjević et al., 2022) and 2) students’ scores that were taken from 10 courses after final exams in each exam period. The following courses were included: Basics of communication in quality management, Basics of management, HRM, Organisational behaviour, Basics of quality management, Methods and techniques in management, Mathematics, Applied Statistics, Establishment and integration of the management systems and Standardized management systems. The courses were classified into three groups by the year of study programme. Regarding the fact that instructors used uniform principles in designing DL courses, the same questionnaire was used for all mentioned courses and students filled it just once. The students’ scores were observed through efficiency (percent of passing the exam in each exam period) and GPA, per course.

The data analysis included descriptive statistics and correlation analysis. The descriptive statistics was used in order to present students’ demographic data, fulfilment of preconditions and opinions about the variables of course design. Linear correlation was applied in order to investigate the strength of the possible connection between student attitudes toward distance education and their achievements.

### 4. Results analysis

The first step in the analysis was related to descriptive statistics of demographic data and student attitudes toward fulfilment of preconditions and the variables of course design. Table 1 and Table 2 show distribution of respondents by 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	36	7	/	22	15	6	18	25
%	83.7	16.3	/	51.2	34.8	14.0	41.9	58.1

Source: Authors (2023)

**Table 2.** Distribution by study year

	1	2	3
N	20	10	13
%	46.51	23.26	30.23

Source: Authors (2023)

The demographic data (Table 1 and Table 2) refer to the following: nearly half of respondents are between 18 and 20 years old, whilst 14% are older than 25 years; greater presence of female respondents (83.7%); three fifths of respondents are not employed; almost 50% of respondents are first year students, while the number of respondents of the second and the third year is nearly the same.

In line with observed in Banjević et al. (2022), the fulfilment of preconditions for DL might be important factor in forming student positive attitudes, and consequently it could affect student achievements. Table 3 and Table 4 show the state of fulfilment of preconditions for DL.

**Table 3.** The fulfilment of preconditions for DL

	Frequency	Percent
<b>The accessibility of a quiet place at home for learning</b>		
Yes	28	65.10
No	4	9.30
Sometimes not	11	25.60
<b>The device used for performing DL</b>		
Own computer (lap-top, tablet)	30	69.80
Mobile phone	11	25.60
Computers in the Academy Library	2	4.70
Other	/	/
<b>The accessibility of a home computer</b>		
Yes	21	48.80
Sometimes not	9	20.90
No, because I don't have a computer	1	2.30
<b>The accessibility of internet connection at home</b>		
I don't have internet at home	12	27.90
Mostly I have problem with internet connection	2	4.70
Mostly I don't have problem with internet connection	17	39.50
I don't have problem with internet connection	12	27.90

Source: Authors (2023)

**Table 4.** The fulfilment of preconditions for DL

	N	Min	Max	Mean	SD
<b>The students` digital skills</b>	43	3	5	4.37	.655
<b>Knowledge of the foreign language required for DL</b>	43	1	5	4.16	.871

Source: Authors (2023)

The data presented in Table 3 and Table 4 refer to conclusion that most of respondents had necessary equipment, access to home computer and internet, quiet place for learning, as well as they assessed their digital skills and knowledge of foreign language as "very good".

As mentioned in introduction, many studies examined student attitudes in relation to course design, the contribution of course design on academic performance in DL, and/or relationship among these variables. Table 5 shows mean, standard deviation and the range of student attitudes toward the variables of course design.

**Table 5.** Student attitudes toward the variables of course design

	<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Mean</b>	<b>SD</b>
Course design (summary)	43	3	5	4.30	.592
Platform and tools are adapted to the course content	43	2	5	4.33	.808
The course obligations are comprehensible	43	1	5	4.26	.954
Asynchronous lectures are available in timely manner and they are in accordance with teaching plan	43	1	5	4.58	.763
Asynchronous lectures are helpful	43	3	5	4.47	.702
Asynchronous lectures are comprehensible	43	2	5	4.12	.931
Case studies/practical samples/analyses are helpful in understanding course content	43	2	5	4.26	.902
Organisation of instructions meet my expectations	43	2	5	4.21	.861
Preparing colloquia and tests are not difficult	43	1	5	3.91	1.130
Learning materials are sufficient for preparation colloquia/tests/exams	43	1	5	4.25	.906
Learning materials for preparation colloquia/tests/exams are available in timely manner	43	1	5	4.47	.797
The teacher provides information and feedback on time	43	3	5	4.47	.591
The teacher is always available in terms of learning support	43	3	5	4.28	.734
Valid N (listwise)	43				

Source: Authors (2023)

Respondents express positive attitudes toward course design (Table 5) ( $M=4.30$ ,  $SD=0.592$ ), which means that they agree. Their opinions on each variable are in range from 3.91 to 4.58, which means that they have positive attitudes toward each variable of course design. These attitudes deviate in one point ( $SD$  ranges from .591 to 1.130). The greatest deviation is related to the attitude "Preparing colloquia and tests are not too difficult" ( $SD=1.130$ ), while the smallest is related to the attitude "The teacher provides information and feedback on time" ( $SD=0.591$ ).

The next step included analysis of student achievements. Student results of observed courses were noted within seven exam periods. The courses were grouped into three groups, as follows:

- Course group 1 (courses of the first year) – Basics of QM, Basics of management, Basics of communication in QM, Mathematics, Statistics Applied.
- Course group 2 (courses of the second year) – Standardized management systems, Human Resource Management.
- Course group 3 (courses of the third year) – Organisational behaviour, Methods and techniques in management, Establishment and integration of the management systems.

Table 6 presents GPA and average efficiency per course groups for all exam periods.

**Table 6.** GPA and average efficiency per course groups

	GPA	Efficiency (%)
Course group 1	6.54	65.40
Course group 2	7.30	81.11
Course group 3	6.90	74.08

Source: Authors (2023)

It can be noted that the GPA differs per study year, but the differences are small – GPA ranges from 6.54 to 7.30. The efficiency by study year varies in almost 16% - it ranges from 65.40% to 81.11%. The efficiency and GPA are higher for the course group 2 (students of the second year of study).

To answer to research question i.e., for the purpose of examining relationship between students' achievements and their attitudes toward course design, the authors used correlation analysis. Firstly, correlation analysis was conducted among course design, efficiency and GPA by course groups. As the normality test showed that the data were not normally distributed, Spearman's rho coefficient was used for investigating the correlation between mentioned variables. Table 7 to Table 9 present results of the correlation analyses.

**Table 7.** Correlation for the course group 1

		GPA	Efficiency	Course design
<b>Course design</b>	Spearman's rho correlation	1	,313	,166
	Sig. (2-tailed)		,180	,483
	N	20	20	20
<b>Efficiency</b>	Spearman's rho correlation	,313	1	,497**
	Sig. (2-tailed)	,180		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho correlation	,166	,497**	1
	Sig. (2-tailed)	,483	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 8.** Correlation for the course group 2

		GPA	Efficiency	Course design
<b>Course design</b>	Spearman's rho correlation	1	-,267	,047
	Sig. (2-tailed)		,456	,897
	N	10	10	10
<b>Efficiency</b>	Spearman's rho correlation	-,267	1	,785**
	Sig. (2-tailed)	,456		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho correlation	,047	,785**	1
	Sig. (2-tailed)	,897	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 9.** Correlation for the course group 3

		GPA	Efficiency	Course design
<b>GPA</b>	Spearman's rho correlation	1	-,430	-,204
	Sig. (2-tailed)		,143	,503
	N	13	13	13
<b>Efficiency</b>	Spearman's rho correlation	-,430	1	,307
	Sig. (2-tailed)	,143		,188
	N	13	13	13
<b>Course design</b>	Spearman's rho correlation	-,204	,307	1
	Sig. (2-tailed)	,503	,188	
	N	13	13	13

Source: Authors (2023)

The values of Spearman's rho correlation coefficient (Table 7 to Table 9) indicate that there are no significant correlations between GPA and student attitudes toward course design, neither between efficiency and student attitudes toward course design.

Based on the previous results, the authors investigated correlation between GPA/ Efficiency and each variable of course design by course groups. The obtained results in most cases indicate the absence of a statistically significant correlation between the values of course design variables and GPA/ Efficiency (Appendix A – Table 10 to Table 45). Regarding the values measured for the course group 1, a statistically significant correlation is determined between variable "Organisation of instructions meet my expectations" and efficiency (0.533,  $p < 0.05$ , Appendix A – Table 16), and between the variable "The teacher provides information and feedback on time" and efficiency (0.457,  $p < 0.05$ , Appendix A – Table 20). In each of these cases the correlation is moderate and positive (Pallant, 2009). No correlations are identified in the case of the remaining two course groups.

## 5. Conclusion

Student attitudes can be important input in creation of course design, as well as an outcome in evaluation of teaching/learning process. In the literature the great number of studies investigated student attitudes in relation to different aspects of distance learning. In this study, the student attitudes were observed as an outcome, and the study considered relationship between student attitudes and their achievements. According to this subject, the findings of some previous research were varied – from strong positive correlation (Nurlianti, 2022; Ma, Yao and Liu, 2017; Erdogan, Bayram and Deniz, 2008; Campbell, Floyd and Sheridan, 2002) to those that did not confirm correlation between student attitudes and their achievements (Fernandes et al., 2022; Ahmad et al., 2017).

The descriptive statistics indicated that fulfilment of preconditions was satisfactory. Students expressed positive opinions toward all observed variables. The similar results were obtained in relation to student attitudes toward the variables of course design. The mean values were in range from 3.91 to 4.58 that referred to positive attitudes. It could be expected that positive attitudes would be resulted in high level of achievements. The efficiency of the second-year students was satisfactory, slightly smaller than the efficiency of the third-year students. The first-year student efficiency was smallest. However, the GPA was not satisfactory in all the cases. It ranged from 6.54 to 7.30, and the maximum possible score was ten.

The correlation analysis confirmed the conclusions of Fernandes et al. (2022) and Ahmad et al. (2017). There were no statistically significant correlations between student attitudes and GPA, neither between student attitudes and their efficiency, regarding all respondents and regarding the division by course groups. These results can be the consequence of the small sample size which is the main limitation of this study. Besides, many other factors could affect student achievements, such as lack of discipline in attending the course, student insufficient engagement, lack of motivation and responsibility, etc. However, the findings of this study could be useful for present and future research, improvements of educational process, instructors and stakeholders from this area.

The main limitation of this study can be the basis for future research. In order to confirm previous conclusions, the greater sample size have to be considered. It would be interesting to compare the data over a longer period of time, which includes the period before and after the transition to online teaching. Furthermore, impact of the other factors (internal and/or external) to student achievements can be analysed.

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## Appendix A

Table 10 to Table 21 show correlation analysis between GPA/ Efficiency and each variable of course design by course group 1.

**Table 10.** "Platform and tools are adapted to the course content", GPA and Efficiency correlation

		<b>Platform and tools are adapted to the course content</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Platform and tools are adapted to the course content</b>	Spearman's rho	1	,091	-,055
	Sig. (2-tailed)		,703	,817
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	,091	1	,497**
	Sig. (2-tailed)	,703		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	-,055	,497**	1
	Sig. (2-tailed)	,817	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 11.** "The course obligations are comprehensible", GPA and Efficiency correlation

		<b>The course obligations are comprehensible</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The course obligations are comprehensible</b>	Spearman's rho	1	,194	,151
	Sig. (2-tailed)		,413	,524
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	,194	1	,497**
	Sig. (2-tailed)	,413		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	,151	,497**	1
	Sig. (2-tailed)	,524	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 12.** "Asynchronous lectures are available in timely manner and they are in accordance with teaching plan", GPA and Efficiency correlation

		<b>Asynchronous lectures are available in timely manner and they are in accordance with teaching plan</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are available in timely</b>	Spearman's rho	1	,097	,106

<b>manner and they are in accordance with teaching plan</b>	Sig. (2-tailed)		,686	,658
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	,097	1	,497**
	Sig. (2-tailed)	,686		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	,106	,497**	1
	Sig. (2-tailed)	,658	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 13.** "Asynchronous lectures are helpful", GPA and Efficiency correlation

		<b>Asynchronous lectures are helpful</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are helpful</b>	Spearman's rho	1	,037	,240
	Sig. (2-tailed)		,878	,308
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	,037	1	,497**
	Sig. (2-tailed)	,878		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	,240	,497**	1
	Sig. (2-tailed)	,308	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 14.** "Asynchronous lectures are comprehensible", GPA and Efficiency correlation

		<b>Asynchronous lectures are comprehensible</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are comprehensible</b>	Spearman's rho	1	,270	,283
	Sig. (2-tailed)		,250	,226
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	,270	1	,497**
	Sig. (2-tailed)	,250		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	,283	,497**	1
	Sig. (2-tailed)	,226	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 15.** “Case studies/practical samples/analyses are helpful in understanding course content”, GPA and Efficiency correlation

		<b>Case studies/practical samples/analyses are helpful in understanding course content</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Case studies/practical samples/analyses are helpful in understanding course content</b>	Spearman’s rho	1	,213	,282
	Sig. (2-tailed)		,368	,228
	N	20	20	20
<b>Efficiency</b>	Spearman’s rho	,213	1	,497**
	Sig. (2-tailed)	,368		,000
	N	20	20	20
<b>GPA</b>	Spearman’s rho	,282	,497**	1
	Sig. (2-tailed)	,228	,000	
	N	20	20	20

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 16.** “Organisation of instructions meet my expectations”, GPA and Efficiency correlation

		<b>Organisation of instructions meet my expectations</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Organisation of instructions meet my expectations</b>	Spearman’s rho	1	,533*	,244
	Sig. (2-tailed)		,016	,301
	N	20	20	20
<b>Efficiency</b>	Spearman’s rho	,533*	1	,497**
	Sig. (2-tailed)	,016		,000
	N	20	20	20
<b>GPA</b>	Spearman’s rho	,244	,497**	1
	Sig. (2-tailed)	,301	,000	
	N	20	20	20

\* . Correlation is significant at the 0.05 level (2-tailed)

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 17.** “Preparing colloquia and tests are not difficult”, GPA and Efficiency correlation

		<b>Preparing colloquia and tests are not difficult</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Preparing colloquia and tests are not difficult</b>	Spearman’s rho	1	,108	,044
	Sig. (2-tailed)		,649	,853
	N	20	20	20
<b>Efficiency</b>	Spearman’s rho	,108	1	,497**
	Sig. (2-tailed)	,649		,000
	N	20	20	20
<b>GPA</b>	Spearman’s rho	,044	,497**	1
	Sig. (2-tailed)	,853	,000	

N	20	20	20
**. Correlation is significant at the 0.01 level (2-tailed).			
Source: Authors (2023)			

**Table 18.** "Learning materials are sufficient for preparation colloquia/tests/exams", GPA and Efficiency correlation

		<b>Learning materials are sufficient for preparation colloquia/tests/exa ms</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Learning materials are sufficient for preparation colloquia/tests/exams</b>	Spearman's rho	1	-,045	-,174
	Sig. (2-tailed)		,849	,463
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	-,045	1	,497**
	Sig. (2-tailed)	,849		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	-,174	,497**	1
	Sig. (2-tailed)	,463	,000	
	N	20	20	20

\*\*.

\*\*.

Source: Authors (2023)

**Table 19.** "Learning materials for preparation colloquia/tests/exams are available in timely manner", GPA and Efficiency correlation

		<b>Learning materials for preparation colloquia/tests/exa ms are available in timely manner</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Learning materials for preparation colloquia/tests/exams are available in timely manner</b>	Spearman's rho	1	,073	,092
	Sig. (2-tailed)		,761	,699
	N	20	20	20
<b>Efficiency</b>	Spearman's rho	,073	1	,497**
	Sig. (2-tailed)	,761		,000
	N	20	20	20
<b>GPA</b>	Spearman's rho	,092	,497**	1
	Sig. (2-tailed)	,699	,000	
	N	20	20	20

\*\*.

\*\*.

Source: Authors (2023)

**Table 20.** “The teacher provides information and feedback on time”, GPA and Efficiency correlation

		<b>The teacher provides information and feedback on time</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The teacher provides information and feedback on time</b>	Spearman’s rho	1	,457*	,209
	Sig. (2-tailed)		,043	,377
	N	20	20	20
<b>Efficiency</b>	Spearman’s rho	,457*	1	,497**
	Sig. (2-tailed)	,043		,000
	N	20	20	20
<b>GPA</b>	Spearman’s rho	,209	,497**	1
	Sig. (2-tailed)	,377	,000	
	N	20	20	20

\*. Correlation is significant at the 0.05 level (2-tailed).

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 21.** “The teacher is always available in terms of learning support”, GPA and Efficiency correlation

		<b>The teacher is always available in terms of learning support</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The teacher is always available in terms of learning support</b>	Spearman’s rho	1	,306	,097
	Sig. (2-tailed)		,190	,685
	N	20	20	20
<b>Efficiency</b>	Spearman’s rho	,306	1	,497**
	Sig. (2-tailed)	,190		,000
	N	20	20	20
<b>GPA</b>	Spearman’s rho	,097	,497**	1
	Sig. (2-tailed)	,685	,000	
	N	20	20	20

\*\*. Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

Table 22 to Table 33 show correlation analysis between GPA/ Efficiency and each variable of course design by course group 2.

**Table 22.** “Platform and tools are adapted to the course content”, GPA and Efficiency correlation

		<b>Platform and tools are adapted to the course content</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Platform and tools are adapted to the course content</b>	Spearman’s rho	1	-,124	,034
	Sig. (2-tailed)		,733	,926
	N	10	10	10
<b>Efficiency</b>	Spearman’s rho	-,124	1	,785**

	Sig. (2-tailed)	,733		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,034	,785**	1
	Sig. (2-tailed)	,926	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 23.** "The course obligations are comprehensible", GPA and Efficiency correlation

		<b>The course obligations are comprehensible</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The course obligations are comprehensible</b>	Spearman's rho	1	-,630	,294
	Sig. (2-tailed)		,051	,410
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	-,630	1	,785**
	Sig. (2-tailed)	,051		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,294	,785**	1
	Sig. (2-tailed)	,410	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 24.** "Asynchronous lectures are available in timely manner and they are in accordance with teaching plan", GPA and Efficiency correlation

		<b>Asynchronous lectures are available in timely manner and they are in accordance with teaching plan</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are available in timely manner and they are in accordance with teaching plan</b>	Spearman's rho	1	-,089	,257
	Sig. (2-tailed)		,807	,474
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	-,089	1	,785**
	Sig. (2-tailed)	,807		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,257	,785**	1
	Sig. (2-tailed)	,474	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 25.** "Asynchronous lectures are helpful", GPA and Efficiency correlation

		<b>Asynchronous lectures are helpful</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are helpful</b>	Spearman's rho	1	,141	,174
	Sig. (2-tailed)		,698	,631
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	,141	1	,785**
	Sig. (2-tailed)	,698		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,174	,785**	1
	Sig. (2-tailed)	,631	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 26.** "Asynchronous lectures are comprehensible", GPA and Efficiency correlation

		<b>Asynchronous lectures are comprehensible</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are comprehensible</b>	Spearman's rho	1	-,282	,000
	Sig. (2-tailed)		,430	1,000
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	-,282	1	,785**
	Sig. (2-tailed)	,430		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,000	,785**	1
	Sig. (2-tailed)	1,000	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 27.** "Case studies/practical samples/analyses are helpful in understanding course content", GPA and Efficiency correlation

		<b>Case studies/practical samples/analyses are helpful in understanding course content</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Case studies/practical samples/analyses are helpful in understanding course content</b>	Spearman's rho	1	,043	,194
	Sig. (2-tailed)		,906	,590
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	,043	1	,785**
	Sig. (2-tailed)	,906		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,194	,785**	1
	Sig. (2-tailed)	,590	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)



**Table 28.** "Organisation of instructions meet my expectations", GPA and Efficiency correlation

		<b>Organisation of instructions meet my expectations</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Organisation of instructions meet my expectations</b>	Spearman's rho	1	,082	,560
	Sig. (2-tailed)		,821	,092
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	,082	1	,785**
	Sig. (2-tailed)	,821		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,560	,785**	1
	Sig. (2-tailed)	,092	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 29.** "Preparing colloquia and tests are not difficult", GPA and Efficiency correlation

		<b>Preparing colloquia and tests are not difficult</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Preparing colloquia and tests are not difficult</b>	Spearman's rho	1	-,197	-,195
	Sig. (2-tailed)		,585	,590
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	-,197	1	,785**
	Sig. (2-tailed)	,585		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	-,195	,785**	1
	Sig. (2-tailed)	,590	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 30.** "Learning materials are sufficient for preparation colloquia/tests/exams", GPA and Efficiency correlation

		<b>Learning materials are sufficient for preparation colloquia/tests/exams</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Learning materials are sufficient for preparation colloquia/tests/exams</b>	Spearman's rho	1	,123	-,068
	Sig. (2-tailed)		,734	,853
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	,123	1	,785**
	Sig. (2-tailed)	,734		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	-,068	,785**	1
	Sig. (2-tailed)	,853	,000	
	N	10	10	10

\*\* Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 31.** “Learning materials for preparation colloquia/tests/exams are available in timely manner”, GPA and Efficiency correlation

		<b>Learning materials for preparation colloquia/tests/exams are available in timely manner</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Learning materials for preparation colloquia/tests/exams are available in timely manner</b>	Spearman’s rho	1	-,130	,197
	Sig. (2-tailed)		,720	,586
	N	10	10	10
<b>Efficiency</b>	Spearman’s rho	-,130	1	,785**
	Sig. (2-tailed)	,720		,000
	N	10	10	10
<b>GPA</b>	Spearman’s rho	,197	,785**	1
	Sig. (2-tailed)	,586	,000	
	N	10	10	10

\*\* Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 32.** “The teacher provides information and feedback on time”, GPA and Efficiency correlation

		<b>The teacher provides information and feedback on time</b>	<b>Efficiency</b>	<b>GPA</b>
<b>The teacher provides information and feedback on time</b>	Spearman’s rho	1	-,089	,073
	Sig. (2-tailed)		,807	,840
	N	10	10	10
<b>Efficiency</b>	Spearman’s rho	-,089	1	,785**
	Sig. (2-tailed)	,807		,000
	N	10	10	10
<b>GPA</b>	Spearman’s rho	,073	,785**	1
	Sig. (2-tailed)	,840	,000	
	N	10	10	10

\*\* Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

**Table 33.** "The teacher is always available in terms of learning support", GPA and Efficiency correlation

		<b>The teacher is always available in terms of learning support</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The teacher is always available in terms of learning support</b>	Spearman's rho	1	-,042	,518
	Sig. (2-tailed)		,908	,125
	N	10	10	10
<b>Efficiency</b>	Spearman's rho	-,042	1	,785**
	Sig. (2-tailed)	,908		,000
	N	10	10	10
<b>GPA</b>	Spearman's rho	,518	,785**	1
	Sig. (2-tailed)	,125	,000	
	N	10	10	10

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Source: Authors (2023)

Table 34 to Table 45 show correlation analysis between GPA/ Efficiency and each variable of course design by course group 3.

**Table 34.** "Platform and tools are adapted to the course content", GPA and Efficiency correlation

		<b>Platform and tools are adapted to the course content</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Platform and tools are adapted to the course content</b>	Spearman's rho	1	-,403	-,417
	Sig. (2-tailed)		,172	,157
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,403	1	,307
	Sig. (2-tailed)	,172		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	-,417	,307	1
	Sig. (2-tailed)	,157	,188	
	N	13	13	13

Source: Authors (2023)

**Table 35.** "The course obligations are comprehensible", GPA and Efficiency correlation

		<b>The course obligations are comprehensible</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The course obligations are comprehensible</b>	Spearman's rho	1	-,261	-,399
	Sig. (2-tailed)		,390	,177
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,261	1	,307
	Sig. (2-tailed)	,390		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	-,399	,307	1

Sig. (2-tailed)	,177	,188	
N	13	13	13

Source: Authors (2023)

**Table 36.** “Asynchronous lectures are available in timely manner and they are in accordance with teaching plan”, GPA and Efficiency correlation

		<b>Asynchronous lectures are available in timely manner and they are in accordance with teaching plan</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are available in timely manner and they are in accordance with teaching plan</b>	Spearman’s rho	1	-,350	-,196
	Sig. (2-tailed)		,242	,522
	N	13	13	13
<b>Efficiency</b>	Spearman’s rho	-,350	1	,307
	Sig. (2-tailed)	,242		,188
	N	13	13	13
<b>GPA</b>	Spearman’s rho	-,196	,307	1
	Sig. (2-tailed)	,522	,188	
	N	13	13	13

Source: Authors (2023)

**Table 37.** “Asynchronous lectures are helpful”, GPA and Efficiency correlation

		<b>Asynchronous lectures are helpful</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are helpful</b>	Spearman’s rho	1	-,264	,099
	Sig. (2-tailed)		,384	,749
	N	13	13	13
<b>Efficiency</b>	Spearman’s rho	-,264	1	,307
	Sig. (2-tailed)	,384		,188
	N	13	13	13
<b>GPA</b>	Spearman’s rho	,099	,307	1
	Sig. (2-tailed)	,749	,188	
	N	13	13	13

Source: Authors (2023)

**Table 38.** “Asynchronous lectures are comprehensible”, GPA and Efficiency correlation

		<b>Asynchronous lectures are comprehensible</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>Asynchronous lectures are comprehensible</b>	Spearman’s rho	1	-,350	-,196
	Sig. (2-tailed)		,242	,522
	N	13	13	13

<b>Efficiency</b>	Spearman's rho	-,350	1	,307
	Sig. (2-tailed)	,242		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	-,196	,307	1
	Sig. (2-tailed)	,522	,188	
	N	13	13	13

Source: Authors (2023)

**Table 39.** "Case studies/practical samples/analyses are helpful in understanding course content", GPA and Efficiency correlation

		<b>Case studies/practical samples/analyses are helpful in understanding course content</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Case studies/practical samples/analyses are helpful in understanding course content</b>	Spearman's rho	1	-,376	-,224
	Sig. (2-tailed)		,205	,463
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,376	1	,307
	Sig. (2-tailed)	,205		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	-,224	,307	1
	Sig. (2-tailed)	,463	,188	
	N	13	13	13

Source: Authors (2023)

**Table 40.** "Organisation of instructions meet my expectations", GPA and Efficiency correlation

		<b>Organisation of instructions meet my expectations</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Organisation of instructions meet my expectations</b>	Spearman's rho	1	-,376	-,224
	Sig. (2-tailed)		,205	,463
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,376	1	,307
	Sig. (2-tailed)	,205		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	-,224	,307	1
	Sig. (2-tailed)	,463	,188	
	N	13	13	13

Source: Authors (2023)

**Table 41.** "Preparing colloquia and tests are not difficult", GPA and Efficiency correlation

		<b>Preparing colloquia and tests are not difficult</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Preparing colloquia and tests are not difficult</b>	Spearman's rho	1	-,364	,114
	Sig. (2-tailed)		,222	,710
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,364	1	,307

	Sig. (2-tailed)	,222		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	,144	,307	1
	Sig. (2-tailed)	,710	,188	
	N	13	13	13

Source: Authors (2023)

**Table 42.** "Learning materials are sufficient for preparation colloquia/tests/exams", GPA and Efficiency correlation

		<b>Learning materials are sufficient for preparation colloquia/tests/exa ms</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Learning materials are sufficient for preparation colloquia/tests/exams</b>	Spearman's rho	1	-,267	-,362
	Sig. (2-tailed)		,377	,224
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,267	1	,307
	Sig. (2-tailed)	,377		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	-,362	,307	1
	Sig. (2-tailed)	,224	,188	
	N	13	13	13

Source: Authors (2023)

**Table 43.** "Learning materials for preparation colloquia/tests/exams are available in timely manner", GPA and Efficiency correlation

		<b>Learning materials for preparation colloquia/tests/exa ms are available in timely manner</b>	<b>Efficiency</b>	<b>GPA</b>
<b>Learning materials for preparation colloquia/tests/exams are available in timely manner</b>	Spearman's rho	1	-,364	,114
	Sig. (2-tailed)		,222	,710
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,364	1	,307
	Sig. (2-tailed)	,222		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	,114	,307	1
	Sig. (2-tailed)	,710	,188	
	N	13	13	13

Source: Authors (2023)

**Table 44.** "The teacher provides information and feedback on time", GPA and Efficiency correlation

		<b>The teacher provides information and feedback on time</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The teacher provides information and feedback on time</b>	Spearman's rho	1	,130	,182
	Sig. (2-tailed)		,673	,552
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	,130	1	,307
	Sig. (2-tailed)	,673		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	,182	,307	1
	Sig. (2-tailed)	,552	,188	
	N	13	13	13

Source: Authors (2023)

**Table 45.** "The teacher is always available in terms of learning support", GPA and Efficiency correlation

		<b>The teacher is always available in terms of learning support</b>		
			<b>Efficiency</b>	<b>GPA</b>
<b>The teacher is always available in terms of learning support</b>	Spearman's rho	1	-,057	,193
	Sig. (2-tailed)		,854	,529
	N	13	13	13
<b>Efficiency</b>	Spearman's rho	-,057	1	,307
	Sig. (2-tailed)	,854		,188
	N	13	13	13
<b>GPA</b>	Spearman's rho	,193	,307	1
	Sig. (2-tailed)	,529	,188	
	N	13	13	13

Source: Authors (2023)