

Course Organization, Faculty-Student Interaction, and Student Involvement and Their Influence to Students' Course Outcomes

La organización del curso y la interacción docente-alumnado y su influencia en los resultados académicos

L'organització del curs i la interacció docent-alumnat i la seua influència en els resultats acadèmics

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ABSTRACT: The purpose of the study is to investigate the influence of course organization, faculty-student interaction, and student involvement in course outcomes at university level. A correlational research design, a structured questionnaire, and a random cluster sample of the students (N=371) were used in the study. The study showed a significant difference somewhere among the mean scores of the course outcomes for the four groups of course organization. It also found a significant difference somewhere among the mean scores of the course outcomes for the five groups of faculty-student interaction, as well as a significant difference somewhere among the mean scores of the course outcomes for the five groups of student involvement. At the same time, the study showed that 32.6% of the variance in course outcomes is explained by course organization, 16.6% of the variance is explained by faculty-student interaction, and 28.4% of the variance is explained by student involvement. The findings of this study enhanced Astin's theory of student development, as course organization, faculty-student interaction, and student involvement are important variables that predict course outcomes.

KEYWORDS: Course organization; student involvement; course outcomes; student development theory; higher education; faculty-student interaction

RESUMEN: El propósito de este artículo es investigar la influencia de la organización del curso, la interacción entre el profesorado y los estudiantes y la participación de estos en los resultados del curso a nivel universitario. En la investigación se emplearon un diseño de investigación correlacional, un cuestionario estructurado y una muestra aleatoria de estudiantes (N=371). El estudio mostró una diferencia significativa en algún punto de las puntuaciones medias en los resultados del curso para los cuatro grupos; también se encontró una diferencia significativa entre las puntuaciones medias de los resultados del curso para los cinco grupos en la interacción profesor-alumno, así como una diferencia significativa entre las puntuaciones medias de los resultados del curso para los cinco grupos de la participación de los estudiantes. Al mismo tiempo, el estudio mostró que el 32,6% de la varianza de los resultados del curso se explica por la organización del curso, el 16,6% de la varianza se explica por la interacción profesor-alumno y el 28,4% de la varianza se explica por la participación de los estudiantes. Los resultados de este estudio refuerzan la teoría de Astin sobre el desarrollo

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de los estudiantes, al incidir en que la organización del curso, la interacción profesor-alumno y la participación de los estudiantes son variables importantes que predicen los resultados del curso.

PALABRAS CLAVE: organización del curso; implicación del alumnado; resultados académicos; teoría del desarrollo del alumnado; educación superior; interacción docente-alumnado

RESUM: El propòsit d'aquest article és investigar la influència de l'organització del curs, la interacció entre el professorat i els estudiants i la participació d'aquests en els resultats del curs a nivell universitari. En la investigació es va fer servir un disseny d'investigació, un qüestionari estructurat i una mostra aleatòria d'estudiants (N=371). L'estudi va mostrar una diferència significativa en algun punt de les puntuacions mitjanes en els resultats del curs per als quatre grups; també es va trobar una diferència significativa entre les puntuacions mitjanes dels resultats del curs per als cinc grups en la interacció, així com una diferència significativa entre les puntuacions mitjanes dels resultats del curs per als cinc grups en relació amb la participació dels estudiants. Al mateix temps, l'estudi va mostrar que el 32,6% de la variància dels resultats del curs s'explica per l'organització, el 16,6% de la variància s'explica per la interacció i el 28,4% de la variància s'explica per la participació dels estudiants. Els resultats d'aquest estudi reforcen la teoria sobre el desenvolupament dels estudiants, ja que incideix en el fet que l'organització del curs, la interacció i la participació dels estudiants són variables importants que prediuen els resultats del curs.

PARAULES CLAU: organització del curs; implicació de l'alumnat; resultats acadèmics; teoria del desenvolupament de l'alumnat; educació superior; interacció docent-alumnat

Practitioner Notes

What is already known about the topic

Course organization, faculty-student interaction, and student involvement are very important elements that affect student course outcomes.

- Astin's theory "Student development theory based on student involvement", has served as one of the main pillars on which the argumentation is based to set up the theoretical framework of this research.
- While topics such as student effort in students' course outcomes have been researched in studies conducted in recent years (Lampert, 1993; Muenks & Miele, 2017), it is noted that study of faculty-student interaction and its influence on academic progress have been considered important (Hagenauer & Volet, 2014).

What this paper adds

- A statistically significant difference was found, with an estimated effect size of .240 (Eta squared), suggesting that approximately 24% of the variance in course outcomes can be explained or accounted for by course organization.
- Levene's Test of Equality of Error Variances shows that it is a significant difference somewhere among the mean scores on the course outcomes for the five groups or scales of faculty-student interaction.
- A statistically significant difference was found, suggesting that approximately 14.7% of the variance in course outcomes can be explained or accounted for by the student involvement featured in the experiment.
- The study found that 32.6% of the variance on course outcomes is explained by course organization, 16.6% of the variance is explained by faculty-student interaction, and 28.4% of the variance is explained by student involvement.

Implications of this research and / or paper

- The important interventions should be designed to support students because it is confirmed by this study that course organization, faculty-student interaction, and student involvement predict course outcomes.
- Overall, the findings of this study enhanced Astin's theory of student development, as well as practical understanding as course organization, faculty-student interaction, and student involvement are important variables that predict course outcomes.

1. INTRODUCTION

Course organization, faculty-student interaction, and student involvement are very important elements that affect student course outcomes. Astin's theory "Student development theory based on student involvement", has served as one of the main pillars on which the argumentation is based to set up the theoretical framework of this research. According to this theory, students should be encouraged as much as possible to be involved in both academic and non-academic activities, because spending time, effort, energy, and investing in these activities, will lead to the desired learning outcomes and the desired professional development (Astin, 1984). While topics such as student effort in students' course outcomes have been researched in studies conducted in recent years (Lampert, 1993; Muenks & Miele, 2017), it is noted that study of faculty-student interaction and its influence on academic progress have been considered important (Hagenauer & Volet, 2014). But student-faculty interaction has a very crucial role in developing students' motivation and achievements (Komarraju, Musulkin, & Bhattacharya, 2010), and has a great impact on students' satisfaction (Bernstein, 2021). The exploration of variables that are directly related to student achievement and students' course outcome is the focus of this article and its findings are helpful to both faculty who are in constant contact with students throughout their work, as well as administrators and student personnel workers. The course organization, faculty-student interaction, as well as student involvement, are supposed to be the important variables that influence course outcomes.

The main aim of the study was to investigate the influence of course organization, faculty-student interaction, and student involvement in course outcomes at the university level. The administrative tasks that are part of educational processes are considered course organization. These tasks include student information, organization of group work, scheduling of activities, and collecting assignments for grading (Lemoine, Seneca, & Richardson, 2019). The conceptual definition of main variables of the study are as follows:

Course organization includes student information, organization of group work, scheduling of activities, and collecting assignments for grading

(Lemoine et al. , 2019, p. 131)

Faculty-student interaction is considered the quality of social and academic relationships that exist between students and the lecturers. Astin (1984) defined student involvement as the amount of physical and psychological energy that the student devotes to the academic experience. Course outcomes is defined as the knowledge, skills, and attitudes that learners will demonstrate by the completion of a course (AAC&U, 2007). The context of the study was university settings where bachelor, Master as well as Integrated Diploma students from economic, humanities, law, natural sciences, and social sciences fields were part of it. A lot of research is carried out to investigate the relationship between different variables and course organization, faculty-student interaction, student involvement, and course outcomes. Hence, there is a gap of studies that investigated the impact of course organization, faculty-student interaction, and student involvement in course outcomes at the university.

2. LITERATURE REVIEW

2.1. Importance of course organization in Higher Education

The organization of the course in Higher Education is very important because it affects both the way the course subject is treated and the course outcomes of the students (Jansen, 2004). Many authors have done a lot of work to investigate the course

organization in Higher Education, and its impact on educational variables, including course outcomes of the students at university level. The most important starting point for an applicable curriculum model should be course outcomes because these are the most important bases that shift the emphasis from the process to what the student benefits from at the end of the course (Allan, 2003).

Essentially an effectively designed course must meet several goals. The first goal is to achieve what students need to learn in that course or course outcomes and the second and most important goal is what competencies students want to develop through the course (Strawser, 2020). According to Hativa (2000), treatment in a coherent way and the use of an orderly and deliberate outline of the content helps the student to follow the logical order of all presentations and to structure in the best way, the new material (Hativa, 2000). Additionally, course organization influences the study progress of students in higher education (Jansen, 2004). And yet, the more structured the information in the course syllabus, the higher the chances of increasing course outcomes (Bateson & Taylor, 2004).

Some authors have raised the idea that courses for undergraduate teaching need to be reformed by adapting to effective problem-based instruction. A very interesting example comes from the University of Delaware. In this university some important initiatives have been taken to transform individual courses and all curricula into inquiry-driven and student-centered formats, to enhance course outcomes in an active and collaborative learning environment (Allen, Duch, & Groh, 1996), as a very effective way to meet the real needs of students' course outcomes (Duch, Groh, & Allen, n.d.). In a certain respect, a very important factor that gets attention is how knowledge is checked out throughout the course.

Assessing students' knowledge is a very important part of course organization and planning (Diamond, 1998), and what students know and how well they know it, should be the target of course outcomes' assessment (Pellegrino, 2001). In this light, can be mentioned the types of assessment that can be used throughout the course to assess the knowledge, competencies, and skills acquired throughout the course and in fulfillment of the course outcomes, because effective assessment of competencies in higher education is the basis for founding comparable academic degrees (Zlatin-Troitschanskaja, Pant, Toepper, Lautenbach, & Molerov, 2017). Types of assessment can be formative assessment, diagnostic assessment, continuous assessment, and summative assessment (Miller, Imrie, & Cox, 1998). In this regard, many authors emphasize the wider use of formative assessment to enhance the learning process and student achievement (Jacoby, Heugh, Bax, & Brandford-White, 2013; Kaftan, Buck, & Haack, 2016; Wang, Wang, Wang, & Huang, 2006). Hence, there is evidence of a positive relationship between course organization and course outcomes of the students.

2.2. Student-Faculty interaction and its effects

The student-faculty interaction is assumed to be one of the important variables that influence course outcomes of the students at the university. A lot of research is carried out to investigate the relationship between student-faculty interaction and different variables, including course outcomes.

Student-faculty interaction can be classified into two types, in-class interaction, and out-of-class interaction. Given this, student-faculty interaction is related to the highest levels of classroom engagement, which on the other hand makes possible students' cognitive skills development (Kim & Lundberg, 2016). Xhomara (2020) indicated that prior knowledge, problem-based teaching, the comprehensive learning approach and assessment explained 50% of the variance in the levels of course outcomes; meanwhile, according to Cox and Orehovec (2007), out-of-class student-faculty interaction can be of five types which can be included in disengagement, incidental contact, functional interaction, personal interaction, and mentoring. Furthermore, the student-faculty

interaction is salient for building a collaborative and productive climate to improve the learning process and to increase course outcomes (Cole & Griffin, 2013; Kim & Sax, 2009), can play a crucial role in fostering student motivation, and engagement in learning (Muñoz, Baik, & Lodge, 2020), and is a powerful predictor of student learning (Kuh & Hu, 2001; Terenzini, Pascarella, & Blimling, 1996).

Additionally, there are a few factors that influence this interaction. In various studies, different authors have identified that open, non-threatening, respectful attitudes, equitable and fair treatment by faculty members, are some of the variables that affect the creation of the right climate, interaction, and what's more student-faculty interaction (Anderson & Carta-Falsa, 2002; Grantham, Robinson, & Chapman, 2015; Parker & Trolan, 2020).

Other studies provided evidence that faculty-student interaction, individual study work and lecturer support have an impact on course outcomes (Delaney, 2008; Xhomara, 2020), academic achievement (Hylton, 2013; Lampert, 1993), and faculty-student relationships can also predict grades (Micari & Pazos, 2012). Likewise, the student-faculty interaction is connected to higher student grade point averages, and higher student satisfaction (Bernstein, 2021). One important facet of this issue is that senior students have a higher frequency of interaction with their faculty, compared to freshmen students (Kuh & Hu, 2001). By the same token, what is found from various studies is that in student-faculty interaction a very important role is played by communication. Jenkins et al., conclude that faculty-student communication models are very important in solving stereotypes and classroom interaction problems (Jenkins, Gappa, & Pearce, 1983).

Given this point of view, one variable that reduces communication and affects a lot of student-faculty interaction is large courses (Gleason, 1984), but using technology offers a lot of opportunities for faculty and students to interact better with each other (Reis-Bergan, Baker, Apple, & Zinn, 2011). Thus, it is evidenced that student-faculty interaction is an important variable and impact course outcomes of the students at the university.

2.3. Student involvement and course outcomes

Student involvement is supposed to be one of the most important variables that impact course outcomes. A lot of research has been done to investigate the association between student involvement and educational variables, including course outcomes of the students at the university.

According to Astin (1993) theory and research, the student involvement in academic activities has to do with how much time and energy they devote to studies, how often they participate in various extracurricular activities and various student activities, as well as interaction with other students and faculty (Astin, 1984, 1993). It is not discussed that to achieve the objectives and course outcomes in each program a student must spend enough time and effort in learning activities, as well as in class participation (Schilling & Schilling, 1999; Xhomara & Baholli, 2022) to have positive results in that course (Everaert, Opdecam, & Maussen, 2017; Nonis & Hudson, 2010). Even, students' thinking concerning the relationship between effort and ability can affect their motivation and course outcomes (Muenks & Miele, 2017).

An element that should not be overlooked is the interaction with other students both in the activities inside the classroom and in the activities outside it. Various studies have shown that the wide student involvement in academic activities is closely related to developing course outcomes in the courses they attend (Camp, 1990; Thomas & Higbee, 2014). At the same time, Xhomara, Karabina, and Hasani (2021) revealed that 9.9% of the variance according to students and 44.4% according to principals on course outcomes is explained by school managerial leadership.

Moreover, participating in various extracurricular activities also helps students/alumni developing self-identity and social networks (Stuart, Lido, Morgan, Solomon, & May, 2011), and is very important for education. Marsh and Kleitman (2002) in their study has found out that total extracurricular student involvement has a positive relationship with course outcomes, meanwhile, Hunt (2007) in his study has provided very interesting findings.

Student involvement in extracurricular activities does not improve course outcomes, but vice versa can be true, achieving better grades may lead students to participate in more extracurricular activities. Additionally, in the context of the widest possible student involvement in academic life, and to improve institutional policies and practices related to this issue, many universities have set up student involvement centers. These centers provide information to meet the academic, professional, and diverse interests of students (Diego, 2021; USF, 2021). Last but not least in this discussion is students' interest. According to many studies, students' interest is essential to course outcomes, and supporting interest throughout the course can contribute to a more involved, motivated, learning experience and performance for students (Harackiewicz, Durik, Barron, Linnenbrink-Garcia, & Tauer, 2008; Harackiewicz, Smith, & Priniski, 2016). Therefore, as above work evidenced, that student involvement is an important variable that influence course outcomes. In the main conclusion of literature review, the investigation of the impact of course organization, faculty-student interaction and student involvement in course outcomes, as resulted in previous research, is important.

2.4. Theoretical Framework

The main axis for constructing all the hypotheses of this study has served Astin's theory, based on which:

....the theory of student involvement argues that a particular curriculum, to achieve the effects intended, must elicit sufficient student effort and investment of energy to bring about the desired learning and development

(Astin, 1984)

The following figure, Figure 1, shows the relationship between the independent research variables and the dependent variable.

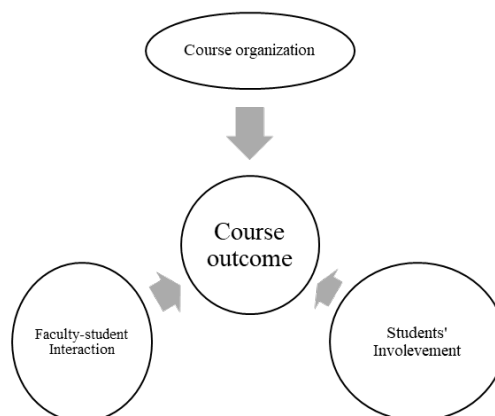


Figure 1. Presentation of the research variables

Based on these elements, the hypotheses of this study have been constructed, as follows:

- H # 1: There is a significant statistical difference in course outcomes scores for different levels of course organization.
- H # 2: There is a significant statistical difference in course outcomes scores for different levels of faculty-student interaction.
- H # 3: There is a significant statistical difference in course outcomes scores for different levels of student involvement.
- H # 4: The variance in course outcomes is explained by course organization, faculty-student interaction, and student involvement.

3. METHOD AND DESIGN

A quantitative approach was the method used in the research. The correlational research design was used. The bachelor's and master's students of two universities were selected to be used in the study. Course organization, faculty-student interaction, and student involvement were selected to be used as independent variables in the research study. Meanwhile, course outcomes was selected to be used as the dependent variable.

3.1. Sample and data collection

A random cluster sample of the students (N=371) from a population of 3150 respondents was selected to be used in the study. Therefore, the sample of the study contains 11.8% of the accessible population. A breakdown of the sample of students included 219 females (59.02%) and 152 males (40.97%) from a population of 1945 females (61.8%) and 1205 (38.2%) males. Regards to the program level, 149 respondents, or 40.1% study in the Bachelor, 165 or 44.4% in the Master, and 57 or 15.3% in the Integrated Diploma from the population of 1229 (39%) Bachelor students, 1397 (44.4%) Master students, and 524 (16.6%) Integrated Diploma students.

A breakdown of broad field study included 67 or 18% of economics, 52 or 14% study in humanities, 133 or 35.8% in law, 34 or 9.1% in the natural sciences, and 85 or 22.8% in the social sciences from the population of 521 (16.7%) economics, 467 (14.8%) humanities, 1139 (36%) law, 309 (9.8%) natural sciences, and 714 (22.7%) social sciences students.

3.2. Analysis

A oneway fixed effects between-subjects analysis of variance (ANOVA) was conducted to evaluate the null hypothesis that course outcomes population means were equal across different groups of course organization, faculty-student interaction, and student involvement score. In ANOVA, researchers evaluate null hypotheses of the sort $H_0: \mu_1 = \mu_2 = \mu_3$ against an alternative hypothesis that somewhere in the means there is a difference (e. g. $H_1: \mu_1 \neq \mu_2 = \mu_3$). Hence, in this regard, the ANOVA can be seen as extending the independent-samples t-test, or one can interpret the independent-samples t-test as a "special case" of the ANOVA (Denis, 2016).

In many research situations, however, researchers are interested in comparing the mean scores of more than two groups. In this situation, they use analysis of variance (ANOVA). One-way analysis of variance involves one independent variable referred to as a factor that has several different levels. These levels correspond to the different groups or conditions (Pallant, 2016).

In this research study, ANOVA was used in comparing the effectiveness of different levels on course outputs scores. Scores can range from 0- 100 points. It is also needed one factor, respectively: course organization, faculty-student interaction, and student involvement with four to five levels. The dependent variable is continuous, in this case, course outputs.

Levene's Test of Equality of Variances evaluates the null hypothesis that variances in each population, as represented by levels of the course organization, faculty-student interaction, and student involvement factors, are equal. If the null hypothesis is rejected, it suggests that somewhere among the variances, there is an inequality.

The relationship between course organization, faculty-student interaction, student involvement, and course outcomes were investigated using the Pearson correlation coefficient. Linear multiple regression was used to assess the skills of control measures to predict course outcomes levels by course organization, faculty-student interaction, and student involvement.

Preliminary analyses were also conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity, and homoscedasticity.

4. RESULTS AND DISCUSSION

The purpose of the study was to investigate the impact of course organization, faculty-student interaction, and student involvement in course outcomes at the university. The meaning of the main variables of the study is as follows. Course organization means student information, organization of group work, scheduling of activities, as well as collecting assignments for grading (Lemoine et al., 2019); meanwhile, Faculty-student interaction counts the quality of social and academic relationships between students and the lecturers. Student involvement is the physical and psychological energy that student devotes to the academic experience (Astin, 1984); meantime, Course outcomes is the knowledge, skills, and attitudes that learners demonstrate by the completion of a course (AAC&U, 2007). The study context was university level that includes students from different fields of studies.

4.1. Descriptive statistics

4.1.1. Effectiveness of Course organization

As shown in Table 1, according to 11% of the students is evidenced to be a not effective course organization; according to 58.9% of them effective and very effective; meanwhile, 26.6% of them are undecided. Central tendency values ($M = 3.70$, $SD = 1.215$), as well as the mode and median value 4.00 and variance 1.475 generated by SPSS 26.0 that refer to the sample of 371 respondents indicate the same tendency for values as measured by frequencies. Hence, according to most students (58.9%), course organization is effective and very effective. Meanwhile, according to less than 1/5th (11%) of the students is evidenced to be a not effective course organization. Therefore, course organization has been evidenced most effective and very effective.

Table 1. Frequencies of Effectiveness of Course Organization Variable

		Course organization			
		Frequency	Percent	Percent	Cumulative Percent
Valid	Not effective	41	11.0	11.1	11.1
	Neutral	99	26.6	26.7	37.7
	Effective	120	32.3	32.3	70.1
	Very effective	111	29.8	29.9	100.0
	Total	371	99.7	100.0	
Missing	System	1	.3		
Total		372	100.0		

4.1.2. Faculty-student interaction

As shown in Table 2, according to 28% of the students is evidenced to be a never or rarely faculty-student interaction; according to 51.1% of them often or always; meanwhile, according to 20.7% of them sometimes. Central tendency values ($M = 3.53$, $SD = 1.344$), as well as the mode 4.00, median value 5.00 and variance 1.806 generated by SPSS 26.0 that refer to the sample of 371 respondents indicate the same tendency for values as measured by frequencies. Hence, according to most students (51.1%), faculty-student interaction is evidenced often or always. Meanwhile, according to less than 1/3rd (28%) of the students is evidenced to be never or rarely faculty-student interaction. Therefore, faculty-student interaction has been evidenced often or always.

Table 2. Frequencies of Faculty-student Interaction Variable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	24	6.5	6.5	6.5
	Rarely	80	21.5	21.6	28.0
	Sometimes	77	20.7	20.8	48.8
	Often	54	14.5	14.6	63.3
	Always	136	36.6	36.7	100.0
	Total	371	99.7	100.0	
Missing	System	1	.3		
Total		372	100.0		

4.1.3. Student involvement

As shown in Table 3, according to 4.9% of the students is evidenced to be a never or rarely student involvement; according to 80.1% of them often or always; meanwhile, according to 14.5% of them sometimes. Central tendency values ($M = 4.34$, $SD = .927$), as well as the mode and median value 5.00 and variance .860 generated by SPSS 26.0 that refer to the sample of 371 respondents indicate the same tendency for values as measured by frequencies. Hence, according to most students (80.1%), student involvement is evidenced often or always. Meanwhile, according to a small percentage (4.8%) of the students is evidenced to be never or rarely student involvement. Therefore, student involvement has been evidenced often or always.

Table 3. Frequencies of the Student Involvement Variable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	3	.8	.8	.8
	Rarely	15	4.0	4.1	4.9
	Sometimes	54	14.5	14.6	19.5
	Often	78	21.0	21.1	40.5
	Always	220	59.1	59.5	100.0
	Total	370	99.5	100.0	
Missing	System	2	.5		
Total		372	100.0		

4.1.4. Level of Course outcomes

As shown in Table 4, according to 5.9 % of the students is evidenced to be a very low or low level of course outcomes; according to 62.7% of them high or very high level; meanwhile, according to 30.9% of them moderate level. Central tendency values (M= 3.74, SD = .871), as well as the mode and median value 4.00 and variance .759 generated by SPSS 26.0 that refer to the sample of 371 respondents indicate the same tendency for values as measured by frequencies. Hence, according to most of the students (62.7%), is evidenced the high or very high level of course outcomes. Meanwhile, according to a small percentage (5.9%) of the students is evidenced to be a very low or low level of course outcomes. Therefore, most of the students have been evidenced a high or very high level of course outcomes.

Table 4. Frequencies of Level of Course Outcomes Variable

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very low level	7	1.9	1.9	1.9
	Low level	15	4.0	4.1	5.9
	Moderate level	115	30.9	31.1	37.0
	High level	165	44.4	44.6	81.6
	Very high level	68	18.3	18.4	100.0
	Total	370	99.5	100.0	
Missing	System	2	.5		
Total		372	100.0		

4.2. Inferential statistics

4.2.1.

H1: Between-subject factors output results evidence 41 cases that correspond not effective mean scores (Table 5), 99 cases neutral mean scores, 119 cases effective mean scores, and 111 cases that correspond very effective mean scores from the sample of 371 respondents of the course organization variable.

The p-value for Levene’s Test of Equality of Error Variances is equal to 0.003, suggesting that somewhere among the variances of course outcomes in the population, there is an inequality.

Table 5. Levene's Test of Equality of Error Variances ^{a,b}

		Levene Statistic	df1	df2	Sig.
Course outcomes	Based on Mean	1.031	3	366	.003
	Based on Median	1.110	3	366	.015
	Based on Median and with adjusted df	1.110	3	360.374	.014
	Based on trimmed mean	1.215	3	366	.004

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Course outcomes

b. Design: Intercept + Course organization

Post-hoc test output reports that the mean difference between course organization not effective and neutral is - .47, and is statistically significant (p = .005); between course organization not effective and effective is - .91, and is statistically significant (p = .000); between course organization not effective and high effective is - 1.31, and

is statistically significant ($p = .000$). Mean difference based on 95% confidence interval between course organization not effective and neutral is between Lower bound (-.83) and Upper bound (-.10); between course organization not effective and effective is between Lower bound (-1.26) and Upper bound (-.55); between course organization not effective and high effective is between Lower bound (-1.67) and Upper bound (-.95). Therefore, it is a significant difference somewhere among the mean scores on the course outcomes for the four groups or levels of course organization.

Table 6 shows that course organization has a Sum of Squares equal to 22.359, which represents the amount of variation due to having different course organization groups. The Error sum of squares is equal to 212.965, which means the amount of variation is not due to course organization. At the same time, the Mean Squares for course organization is 22.359, and the Mean Squares for Error is .582. A statistically significant difference was found ($F = 38.426$ on 3 df, $p < 0.001$), with an estimated effect size of .240 (Eta squared). This suggesting that approximately 24% of the variance in course outcomes can be explained or accounted for by the course organization featured in the experiment. Hence, course organization is a good predictor of course outcomes.

The result was consistent with previous scientific works, which argued that course organization predicts course outcomes (Allen et al., 1996; Bateson & Taylor, 2004; Diamond, 1998; Duch et al., n.d.; Hativa, 2000; Jansen, 2004; Pellegrino, 2001).

These works support the research result that enhance the conclusion that course organization impact course outcomes at the university level. Therefore, hypothesis # 1: *There is a significant statistical difference in course outcomes scores for different levels of course organization*, is supported.

Table 6. Tests of Between-Subjects Effects: Course organization vs. Course outcomes ^{a,b}

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	67.078a	3	22.359	38.426	.000	.240
Intercept	3987.851	1	3987.851	6853.476	.000	.949
Course organization	67.078	3	22.359	38.426	.000	.240
Error	212.965	366	.582			
Total	5442.000	370				
Corrected Total	280.043	369				

a. Dependent Variable: Course outcomes

b. R Squared = .240 (Adjusted R Squared = .233)

H2: Between-subject factors output results include 24 cases that correspond never mean scores (Table 7), 80 cases rarely mean scores, 76 cases sometimes mean scores, 54 cases often mean scores, and 136 cases that correspond always mean scores from the sample of 371 respondents of the faculty-student interaction variable.

The p-value for Levene’s Test of Equality of Error Variances is equal to 0.000, suggesting that somewhere among the variances of course outcomes in the population, there is an inequality.

Table 7. Levene's Test of Equality of Error Variances: Faculty-student interaction vs Course outcomes ^{a,b}

	Levene Statistic	df1	df2	Sig.
Based on Mean	6.456	4	365	.000
Based on Median	3.098	4	365	.016

Course outcomes

Continued on next page

Table 7 continued

	Levene Statistic	df1	df2	Sig.
Based on Median and with adjusted df	3.098	4	339.407	.016
Based on trimmed mean	6.798	4	365	.000

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Course outcomes

b. Design: Intercept + Faculty-student interaction

Post-hoc test output shows that the mean difference between faculty-student interaction never and rarely is $-.63$, and is statistically significant ($p = .004$); between faculty-student interaction never and sometimes is -1.06 , and is statistically significant ($p = .000$); between faculty-student interaction never and often is -1.57 , and is statistically significant ($p = .000$); between faculty-student interaction never and always is -1.32 , and is statistically significant ($p = .000$).

Mean difference based on 95% confidence interval between faculty-student interaction never and rarely is between Lower bound (-1.12) and Upper bound ($-.56$); between faculty-student interaction never and sometimes is between Lower bound (-1.55) and Upper bound ($-.55$); between faculty-student interaction never and often is between Lower bound (-2.09) and Upper bound (-1.06); between faculty-student interaction never and always is between Lower bound (-1.78) and Upper bound ($-.85$).

Therefore, it is a significant difference somewhere among the mean scores on the course outcomes for the five groups or scales of faculty-student interaction.

Table 8 shows that faculty-student interaction has a Sum of Squares equal to 64.872, which represents the amount of variation due to having different faculty-student interaction groups. The Error sum of squares is equal to 215.172, which means the amount of variation is not due to faculty-student interaction. At the same time, the Mean Squares for faculty-student interaction is 16.218, and the Mean Squares for Error is .590. A statistically significant difference was found ($F = 27.511$ on 4 df, $p < 0.001$), with an estimated effect size of .232 (Eta squared). This suggesting that approximately 23.2% of the variance in course outcomes can be explained or accounted for by faculty-student interaction featured in the experiment. Hence, faculty-student interaction is a good predictor of course outcomes.

The result was consistent with prior research, which argued that faculty-student interaction predicts course outcomes. The result was consistent with many previously works, who indicated that faculty-student interaction predicts course outcomes scores (Anderson & Carta-Falsa, 2002; Bernstein, 2021; Cole & Griffin, 2013; Cox & Orehovec, 2007; Delaney, 2008; Hylton, 2013; Kim & Lundberg, 2016; Kuh & Hu, 2001; Lampion, 1993; Micari & Pazos, 2012; Muñoz et al., 2020; Parker & Trolan, 2020; Terenzini et al., 1996). The abovementioned studies support the research finding that enhance the conclusion that faculty-student interaction impact course outcomes at the university. Therefore, hypothesis # 2: *There is a significant statistical difference in course outcomes scores for different levels of faculty-student interaction*, is supported.

Table 8. Tests of Between-Subjects Effects: Faculty-student interaction vs Course outcomes ^{a,b}

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	64.872a	4	16.218	27.511	.000	.232
Intercept	3444.320	1	3444.320	5842.668	.000	.941
Faculty-student interaction	64.872	4	16.218	27.511	.000	.232

Continued on next page

Table 8 continued

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Error	215.172	365	.590			
Total	5442.000	370				
Corrected Total	280.043	369				

a. Dependent Variable: Course outcomes

b. R Squared = .232 (Adjusted R Squared = .223)

H3: Between-subject factors output results evidence 3 cases that correspond never mean scores (Table 9), 15 cases rarely mean scores, 53 cases sometimes mean scores, 78 cases often mean scores, and 220 cases that correspond always mean scores from the sample of 371 respondents of the student involvement variable.

The p-value for Levene's Test of Equality of Error Variances is equal to 0.005, suggesting that somewhere among the variances of course outcomes in the population, there is an inequality.

Post-hoc test output shows that the mean difference between student involvement never and rarely is -.80, and is statistically significant ($p = .005$); between student involvement never and sometimes is -1.26, and is not statistically significant ($p = .066$); between student involvement never and often is -1.79, and is statistically significant ($p = .002$); between student involvement never and always is -1.91, and is statistically significant ($p = .001$).

Table 9. Levene's Test of Equality of Error Variances: Student involvement vs Course outcomes ^{a,b}

Course outcomes	Levene Statistic	df1	df2	Sig
Based on Mean	2.060	4	364	.005
Based on Median	1.147	4	364	.014
Based on Median and with adjusted df	1.147	4	286.425	.015
Based on trimmed mean	1.812	4	364	.003

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

a. Dependent variable: Course outcomes

b. Design: Intercept + Student involvement

Mean difference based on 95% confidence interval between student involvement never and rarely is between Lower bound (-2.20) and Upper bound (.60); between student involvement never and sometimes is between Lower bound (-2.58) and Upper bound (.05); between student involvement never and often is between Lower bound (-3.10) and Upper bound (-.49); between student involvement never and always is between Lower bound (-3.20) and Upper bound (-.62).

Therefore, it is a significant difference somewhere among the mean scores on the course outcomes for the five groups or scales of the student involvement.

Table 10 shows that student involvement has a Sum of Squares equal to 40.837, representing the amount of variation due to having different student involvement groups. The Error sum of squares is equal to 236.602, meaning the amount of variation is not due to student involvement. Meanwhile, the Mean Squares for student involvement is 10.209, and the Mean Squares for Error is .653. A statistically significant difference was found ($F = 15.640$ on 4 df, $p < 0.001$), with an estimated effect size of .147 (Eta squared). This suggesting that approximately 14.7% of the variance in course outcomes can be explained or accounted for by the student involvement featured in the experiment. Hence, student involvement is a good predictor of course outcomes.

Table 10. Tests of Between-Subjects Effects: Student involvement vs Course outcomes ^{a,b}

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	40.837a	4	10.209	15.640	.000	.147
Intercept	569.954	1	569.954	873.156	.000	.706
Effort	40.837	4	10.209	15.640	.000	.147
Error	237.602	364	.653			
Total	5417.000	369				
Corrected Total	278.439	368				

a. Dependent Variable: Course outcomes

b. R Squared = .147 (Adjusted R Squared = .137)

The result was consistent with prior research works, which argued that student involvement predicts course outcomes. The result was consistent with many previously works, who indicated that student involvement predicts course outcomes scores (Astin, 1984, 1993; Camp, 1990; Everaert et al., 2017; Harackiewicz et al., 2008, 2016; Marsh, 1992; Nonis & Hudson, 2010; Schilling & Schilling, 1999; Stuart et al., 2011). These research results support finding of the study that enhance the conclusion that student involvement influence course outcomes at the university level. Therefore, hypothesis # 3: *There is a significant statistical difference in course outcomes scores for different levels of student involvement*, is supported.

H4: A one-tailed test is used to test the alternative hypothesis that the variance in course outcomes is explained by course organization, faculty-student interaction, and student involvement. Therefore, to test the possibility of the relationship in this direction.

As shown in Table 11 there is a moderate positive correlation, Pallant (2016) that indicates that values between 0.3 and 0.6 or -0.3 and -0.6 indicate a moderate positive or negative linear relationship, between course organization and course outcomes variables, $r = .480$, $n = 369$, $p < .005$. Hence, high scores of course organization are associated with high scores of course outcomes.

Table 11. Pearson correlations (r) outputs of the relationships between course organization, faculty-student interaction, student involvement, and course outcomes.

		Course outcomes	Course organization	Faculty-student interaction	I studied and put effort into the course
Pearson Correlation	Course outcomes	1.000	.480	.417	.362
	Course organization	.480	1.000	.645	.166
	Faculty-student interaction	.417	.645	1.000	.144
	I studied and put effort into the course	.362	.166	.144	1.000
Sig. (1-tailed)	Course outcomes	.	.000	.000	.000
	Course organization	.000	.	.000	.001
	Faculty-student interaction	.000	.000	.	.003
	I studied and put effort into the course	.000	.001	.003	.
N	Course outcomes	369	369	369	369
	Course organization	369	369	369	369

Continued on next page

Table 11 continued

	Course outcomes	Course organization	Faculty-student interaction	I studied and put effort into the course
Faculty-student interaction	369	369	369	369
I studied and put effort into the course	369	369	369	369

There is a moderate positive correlation between Faculty-student interaction and course outcomes variables, $r = .417$, $n = 369$, $p < .005$. Hence, high scores of faculty-student interaction are associated with high scores of course outcomes.

There is also a moderate positive correlation between the student involvement and course outcomes variables, $r = .362$, $n = 369$, $p < .005$. Hence, high scores of student involvement are associated with high scores of course outcomes.

The mean of the unstandardized residuals is equal to 0. The skewness measure is equal to 0.001, meaning that normality of residuals. The stem-and-leaf plot, the boxplot, and the Q-Q plot of residuals suggested a normal distribution, and null hypotheses for Kolmogorov-Smirnov and Shapiro-Wilk tests were not rejected, giving reason to support the normality assumption. Residuals appeared to be distributed approximately evenly above and below 0, with no discernible pattern: - linear, curvilinear, or other evident. Therefore, linearity was satisfied, as well as homoscedasticity of residuals.

Table 12. Beta Standardized Coefficients of the relationships between course organization, faculty-student interaction, student involvement, and course outcomes ^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
	B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
()	1.331	.200		6.658	.000					
Course organization	.233	.040	.326	5.784	.000	.480	.290	.248	.578	1.730
Faculty-student interaction	.107	.036	.166	2.945	.003	.417	.152	.126	.582	1.718
I studied and put effort into the course	.267	.041	.284	6.523	.000	.362	.323	.280	.970	1.031

a. Dependent Variable: Course outcomes

The beta value for course organization is .326, for Faculty-student interaction is .166, and for student involvement is .284 (Table 12). The result means that 32.6% of the variance on course outcomes is explained by course organization, 16.6% of the variance is explained by faculty-student interaction, and 28.4% of the variance is explained by student involvement. The result was consistent with some previous works, which indicated that course organization, faculty-student interaction, student involvement predicts course outcomes scores. The result was consistent with some previously reported works, who argued that course organization, faculty-student interaction, and student involvement influence course outcomes scores (Anderson & Carta-Falsa, 2002; Astin, 1984, 1993; Bateson & Taylor, 2004; Camp, 1990; Duch et al., n.d.; Grantham et al., 2015; Harackiewicz et al., 2016; Kim & Sax, 2009; Kuh & Hu, 2001; Marsh & Kleitman, 2002; Parker & Trolan, 2020; Terenzini et al., 1996; Thomas & Higbee, 2014).

The abovementioned research works support finding of the study that enhance the conclusion that student involvement influence course outcomes at the university. Therefore, based on the statistical outputs shown above, *H # 4: The variance in course outcomes is explained by course organization, faculty-student interaction, and student involvement*, which is supported.

5. CONCLUSION AND IMPLICATIONS

One main limitation of the study should be acknowledged as part of the conclusions. The measurement of the course organization, faculty-student interaction, student involvement, and course outcomes, is made based on self-reported instruments. The purpose of the study is to investigate the influence of course organization, faculty-student interaction, and student involvement in course outcomes. The prior assumption was that course organization, faculty-student interaction, and student involvement scores influence course outcomes at the university level.

The study found that, according to most of the students, course organization is effective and very effective; meanwhile, according to less than 1/5th of the students is not effective. Therefore, the faculties should support development or improvement of course organization. It is revealed that, according to most of the students, faculty-student interaction is evidenced often or always; meanwhile, according to less than 1/3rd of the students never or rarely. Thus, the lecturers should facilitate and support improvement of faculty-student interaction. The study showed that, according to most of the students, the student involvement is evidenced often or always; meanwhile, according to a small percentage of the students never or rarely. Hence, the faculties should improve the student involvement in the teaching and learning process at the university. It is indicated that, according to most of the students, the high or very high level of course outcomes; meanwhile, according to a small percentage of the students very low or low level. Therefore, the lecturers should consider their work to improve course outcomes.

Levene's Test of Equality of Error Variances suggests that it is a significant difference somewhere among the mean scores on the course outcomes for the four groups or levels of course organization. A statistically significant difference was found, with an estimated effect size of .240 (Eta squared), suggesting that approximately 24% of the variance in course outcomes can be explained or accounted for by course organization. Therefore, course organization is a good predictor of course outcomes.

Levene's Test of Equality of Error Variances shows that it is a significant difference somewhere among the mean scores on the course outcomes for the five groups or scales of faculty-student interaction. A statistically significant difference was found, suggesting that approximately 23.2% of the variance in course outcomes can be explained or accounted for by faculty-student interaction featured in the experiment. Thus, faculty-student interaction is a good predictor of course outcomes.

Levene's Test of Equality of Error Variances suggests that it is a significant difference somewhere among the mean scores on the course outcomes for the five groups or scales of the student involvement. A statistically significant difference was found, suggesting that approximately 14.7% of the variance in course outcomes can be explained or accounted for by the student involvement featured in the experiment. Therefore, student involvement is a good predictor of course outcomes.

The study found a medium positive correlation between course organization and course outcomes variables. It is revealed a medium positive correlation between faculty-student interaction and course outcomes variables. The study also revealed a medium positive correlation between the student involvement and course outcomes variables. The beta value revealed meaning that 32.6% of the variance on course outcomes is explained by course organization, 16.6% of the variance is explained

by faculty-student interaction, and 28.4% of the variance is explained by student involvement.

The results of this study have also important implications for practice. The important interventions should be designed to support students because it is confirmed by this study that course organization, faculty-student interaction, and student involvement predict course outcomes. Overall, the findings of this study enhanced Astin's theory of student development, as well as practical understanding as course organization, faculty-student interaction, and student involvement are important variables that predict course outcomes. This main conclusion is generated based on the revelation of this study that there is a significant relationship between course organization, faculty-student interaction, student involvement and course outcomes, as well as that course organization, faculty-student interaction, and student involvement explain significantly the variance of course outcomes.

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