The effect of cooperative learning strategy on the engagement in architectural education

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Abstract. Cooperative learning is one of the important educational strategies that have been adopted in the student-centered curricula, and an important step in learning and education is the development and enhancement of student learning and their interaction with improving the effectiveness of teaching. The aim of this research is to study the impact of the use of cooperative learning strategy and its impact on academic engagement and its reflection on student performance achievement and results of their learning process for a sample of students from the Department of Architecture in the College of Engineering at Mustansiriya University. The results showed a strong correlation between cooperative learning strategy and academic engagement in the educational process with high impact factor between the two variables, so the result was positive, which enhanced the academic achievement results for the stage as well as an increase in technical and academic skills for students by helping them meet the design requirements and enhancing their social skills, so they became more motivating and willing to learn and strengthen social relations between students and the faculty as well as the influence of time factor where teamwork significantly reduced time at the level of achievement, in addition to the time devoted to criticism for five group individuals. The experiment demonstrated the effect of cooperative learning strategy on the level of student engagement in terms of its four characteristics:

- Behavioral engagement through effective engagement into group work.
- An increase in the desire to work and an improvement in social relations, and hence, increase in the rates of emotional engagement.
- Cognitive merger by noting an improvement in academic performance in general compared to individual performance.
- The individual effort may not be apparent to some students due to the interlock of joints of work at the group level.

1. Introduction

The architecture profession has a lot to offer society as a whole. The architect, in particular, has multiple skills and capabilities and is valuable to provide to society as well as the ethical function of architecture. The architect is the citizen-architect model that spreads architectural education and its practice for several generations, thus, the architecture is a collaborative profession and is a conversation across generations, and this is an invitation to the citizen architect to connect with society as a whole, for the sake of the profession and the work to create architecture based on human experience [1].
Al-Jadrji (2006) emphasizes that insofar as architecture has a conscious will sympathetic to the concerns of others in its various social roles in achieving architecture and satisfying the need for it, as far as transparency in collective dialogue is achieved. Through this dialogue, society secures a collective cohesion and human familiarity for itself, and it is achieved as a consequence of that harmony and cohesion among the members of the group [2].

The cooperative work in architectural education is considered a prelude to the professional experience to achieve and accomplish the architectural project, as the visions of cooperative architectural work are embodied through the participation of students in the completion of a project by defining a common goal with meaning that directs the work in a way that achieves the goals of the project in particular and the goals of the educational institution in general as well as thinking in performing the roles of students within one team and determining evaluation mechanisms as part of the conditions and limitations of cooperative work.

The use of a cooperative learning strategy to teach architecture can change the student’s point of view in their professional live. It aims to teach students lifelong learning skills, develop value and intellectual concept systems as well as professional skills, and allow students to understand the interrelationship between competing areas of knowledge and how they will be applied in practice and real life. It also teaches students how to search, interpret and apply information.

The concept of collaborative learning is not new. Johnson et al. (1991) suggested that cooperative learning is an ancient idea dating back to work in the seventeenth century by (John Amos Comenius and Barnes et al., 1994). Cooperative learning was periodically adopted in the general education system in the United States, where in (1875-1880) Francis Parker used this curriculum in public schools [3].

John Dewey also encouraged the use of collaborative learning as part of the educational curriculum in the early twentieth century [4].

Collaborative learning is a successful learning strategy, in which, groups comprised of small teams of students with different capacities use different methods of learning to develop their understanding of the subject. Each member of the team is responsible not only for learning the subject given to him/her but also for helping the rest of the team members learn [3].

Robertson (2012) defines collaborative learning as “an educational strategy in which students work together in carefully designed groups to enhance positive cohesion [5].

Bonwell & Eison (1991) emphasizes that students learn more by doing more effectively than just watching and listening, and this has been known for a long time as cognitive psychology. The collaborative learning by nature is an effective method, where it enhances learning in several ways by supporting the weak members of the group, as they are often directed to work in this manner at the right time [6].

Bick (2013) defined it as a student-centered learning strategy, facilitated by the teacher, where a small group of students is responsible for learning it and learning for all the group members. Students interact with each other in the same group to obtain and practice subject elements to solve a problem, complete a task or achieve a goal [7].

According to Holzinger, Dusitnanond (2007) indicated that students who work competitively have an incentive to not help each other, while working cooperatively will reward the student for his assistance, as there is evidence that shows that the student, when given the freedom to explore topics that raise his personal interests and help by encouraging the understanding of teachers, will lead to their social and personal development, regardless of achieving excellent academic results [3].

Enhancing interconnectedness within related groups encourages students' ability to help each other, as needed, by explaining the content to each other, while learning constructive suggestions, assisting with other analysis, doing tasks and giving feedback. Good communication, personal and group skills are important elements of this process [8].

Collaborative learning is concerned with framing student inclusion in ways that potentially increase positive bonding and enhance interaction, and this means, instead of working individually with everyone in competition with each other, the student can develop interdependence within teams where positive bonding in cooperative learning is built between students to achieve their goals; Students believe that they achieve their goals through the group [9].
It is clear from the above that cooperative learning is a learning strategy that focuses on building and developing the skills of individuals within the group and socially develop them, as it promotes the engagement and social and cognitive interaction of learners.

2. The basic elements of cooperative learning
Cooperative learning usually supplements the teacher’s instructions by giving students an opportunity to discuss information or practice the skills the teacher originally provided; collaborative methods sometimes require students to find or discover their information themselves [9]. For a cooperative lesson to be successful and effective, it must contain the following basic components (Slavin, 1991, Bick, 2013, Dusitnanond, 2007):
- **The positive interdependence (we sink or swim together).** The efforts of each member of the team are required for the success of the group and each member has distinctive participation in the success of this joint effort and its role and responsibilities entrusted to him. Students must feel that they need each other in order to complete the group's mission, and such feeling can be achieved through:
  A - Giving rewards as motivation.
  B - Setting common goals.
  C - Share their information.
  D - Defining the roles of each element in the group.
Lang (1995) also stresses that it addresses the issue of positive correlation inherent in the cooperative class and suggests that the cooperative classroom evolve when group members develop a positive correlation. To encourage this positive correlation, students should be responsible for each individual aspect of the group’s assignments [8].
- **The enhanced interaction.** Preferably face-to-face. Students need to do real work together, as they promote each other's success by merging both resources and efforts, supporting and encouraging each party to achieve it, searching for understanding, discussing concepts being learned and linking between the present and past learning.
- **Individual responsibility.** Two levels of responsibility must be structured in cooperative lessons. The group should be responsible for achieving its goals, in addition to that each member is responsible for contributing to his share of the work. The individual responsibility appears when each student's performance is evaluated and the results are returned to the group and the individual in order to make sure who is in need to assistance. There are opportunities for learning that are unique to cooperative learning. These opportunities can be summarized as follows:
  A - Convincing the argument that is made through the use of logical reasoning.
  B - Learners can access meaningful learning. Learners raise questions, discuss ideas, make mistakes, learn the art of listening, and receive constructive criticism as well as it provides opportunities to summarize what they have learned in the form of a report.
  C - The learner learns by speaking, listening, explaining, and thinking with others and with himself.
  D - Mutual dependence requires that learners help each other in learning concepts and mastering the skills that the group learns, thereby providing opportunities to ensure the success of all learners.
- **The internal interpersonal relationships.** Small group skills and social skills that must be learned by students are leadership, decision making, confidence building, and communication and problem management skills. Collaborative learning is, of course, more complicated than personal learning because students must employ all of these skills together in the task of work (learning academic subject) and teamwork (working effectively as a group).
- **The group progress.** The group is addressed when group members discuss how successful they are in achieving their goals and maintaining their effectiveness of working relationships.
Dusitnanond, (2007) states that when teachers are eligible to use collaborative learning, understanding must be guided by their current knowledge of educational practices and teaching methods and their previous understanding of educational background, including school arrangements,
curricula, and student characteristics, and then reorganize the information they obtain about collaborative learning to suit the current education plan. Additionally, the teaching plan should include cooperative learning [3].

Slavin (1987) also emphasizes that collaborative learning can improve students’ social skills, increase self-confidence, and foster social values providing positive motivation. By contrast, when instructions only confirm individual achievement, some students may lose self-esteem, as well as the motivation to do their best [9].

Lang (1995) denotes that enhancing individual accountability makes each group member accountable to the group by completing a specific part of the collaborative learning task and therefore each student will have to demonstrate mastery of the lesson content and personal skills he needs in order to integrate into group learning [9].

It is clear from previous proposals that cooperative learning requires:

- Having a goal at the individual and group level.
- The sense of individual and group responsibility increases.
- Achieving the concept of social inclusion and the social skills that must be learned by students that are leadership, decision-making, confidence-building, communication, and problem-management skill.
- Access to significant learning through students’ experiences in collaborative work.
- Learning could be achieved through speaking, listening, explaining, and logical thinking with others and with the student himself.

3. Cooperative learning strategies

The strategies that are used for cooperative learning are numerous and varied as a result of development in the field of educational science and due to studies and research conducted in this field. There are general strategies for cooperative learning that are suitable for use in various study sciences [10].

1. The arrangement of the intermittent tasks (jigsaw puzzle)

It is a strategy based on dividing students into small groups consisting of (3-5) students, dividing the lesson into sub-tasks commensurate with the size of the group, and the individuals of each sub-task will master it and return to the basic group to exchange experiences between them. The implementation of the strategy is carried out according to the following steps:

- Forming basic groups, and this is done by dividing the students in the classroom into small groups of (3-5) students, and dividing the lesson into a group of sub-tasks, each individual in each group is given one task to study.
- The formation of groups of experience, and this is done by grouping the members of the single task in the basic groups into small groups, the number of which is determined by the total number of groups in the class, to study among them the task assigned to them through the available resources, based on direct interaction and constructive cooperation between them.

2. Sections of the student team and achievements (STAD)

STAD’s approach, developed by slavin (1991), uses collaborative competition where teachers translate results into team results using achievement sections. The highest score forms the summit.

3. Group Inquiry (GI)

GI’s collaborative learning approach, developed by sharan (1980), is particularly effective in enhancing higher-order thinking skills as students collect data and then discuss, translate and create individuals’ contributions to the group’s product [3].

4. Academic Engagement:

Academics differed in determining the dimensions of the engagement, some of them presented a two-dimensional model, while some presented three-dimensional. A study of Reeve (2012) was presented
to describe the engagement of students during learning activities as a constructive component that includes behavioral, emotional and cognitive aspects. It is proposed to add the engagement with the delegation as an important new feature, which is defined as a constructive contribution for students in the flow of information they receive. So, the research will adopt this term (feature) instead of (dimension) in introducing the concept in the context of the research. (Reeve et al., 2012; Paris, 2004; Trowler, 2010). There are four features which include:

5. Aspects of engagement
A study (J Reeve 2012) was presented to describe the engagement of students during learning activities as a constructive component that includes behavioral, emotional and cognitive aspects (Aspects). (2012, Fredricks, Blumenfield, & Paris, 2004 and 2010, Trowler) have four features which include:

First: Behavioral engagement:
It is a judgment about the extent to which a student is actively involved in learning activities that involve: assessment, focus, attention and effort [11]

Fredricks et al. (2004) define behavioral engagement as an interaction based on an individual’s participation in academic, social, and extracurricular processes in an educational institution in the context of multidimensional concepts and is one of the features of engagement, which is used to determine whether student participation completely in all of the academic activities provided by the institution as well as the curriculum [12].

As students who integrate behaviorally usually conform to the rules and behavioral norms such as attendance and contribution, and thus the absence of subversive or negative behavior. It refers to students' special behaviors related to learning, such as focus, exerting effort and taking initiative, being continuous in facing failure and following the rules and positive interaction with teachers and peers among others (Conner, 2011). Researches indicate that the behavioral dimension is likely to lead to greater academic achievement (Hattie, 2013) as a mediator between contextual factors and desirable learning outcomes. Behavioral inclusion can be increased by changing aspects of the learning environment [13].

It is clear from the above that behavioral inclusion is based on effective inclusion in learning activities that involve: assessment, focus, attention, effort and taking the initiative.

Second: Emotional engagement:
Emotional engagement was defined by Fredricks et al. (2004) as focusing on how students interact and deal with the educational institution and includes feelings of belonging or evaluation or a feeling that he/she is important to his/her educational institution, as well as an appreciation of success in study-related outcomes [14].

Furthermore, emotional engagement focuses on the extent of positive/negative reactions to faculty, peers, academics, and the institution in general. As it is assumed, positive emotional engagement contributes to students’ relations with educational institutions, i.e. college and university, and affects students’ desire to study and merge into other activities related to the institution. Students who integrate emotionally enjoy emotional reactions such as enjoyment and a sense of belonging [15].

It is clear from the above that emotional engagement focuses on the interaction and dealing of students and includes feelings of belonging, evaluation or feeling, as students who emotionally integrate enjoy emotional reactions such as enjoyment and a sense of belonging.

Third: Cognitive engagement
It is a matter of student will, that is, how students feel about themselves, their work, their skills, and the strategies they use to perfect their work [16].

Teachers may be Knowledgeable with the student who works always hard but seems unable to learn effectively, as this student is integrated into the behavior, but not merged cognitively. In other words, just because students are working on the task at hand, does not mean they are learning. It is important to note that this effort participates in both behavioral and cognitive definitions of inclusion, and in this sense, cognitive engagement refers to the quality of student engagement, while absolute effort indicates the amount of their participation in the task [17], whereas the inclusion of cognitive engagement makes a significant distinction between students’ efforts to do work and the effort that
focuses on understanding and mastery. Fredricks et al. (2004) defined it as student investment in the educational institution and learning processes, as a cognitively engaged student is an optimistic, strategic, and willing student to make the necessary effort to understand complex ideas or master difficult skills.

Cognitive engagement is often concerned with the extent to which students invest in learning and whether they are willing to work additional to obtain better academic results, and this is what the author referred to [18].

Cognitive engagement is a self-organized method or strategy of learning in which students use Metacognition Strategies for planning, monitoring, and knowledge assessment [19].

Connell & Wellbron (1991) and Pintrich & De Groot (1990) have agreed that there are three components of self-organized learning in the classroom:

1. Metacognitive strategy for planning, monitoring and modifying learning.
2. Managing and controlling efforts of learning and academic assignments.
3. Cognitive strategies that students use for learning, remembering, and learning tasks [20].

It is clear from the above that students’ efforts to do the work and effort that focuses on understanding and mastery, the cognitively integrated student is an optimistic, strategic student, and ready to make the necessary effort to understand complex ideas or master difficult skills and focus on the quality of student engagement.

Fourth: Agentic Engagement:

It is the extent of trying to enrich the learning experience rather than just receiving it negatively as given (Reeve, 2012, p3). T.seng (2001) has claimed that in this kind of engagement students deliberately create and personalize what they learn and define conditions under which learning takes place, where students demonstrate initiative, ask questions, express what they need, make recommendations regarding learning goals and topics, make teachers know what they want and what they care about, identify learning resources and opportunities, ask for clarifications, and find options [21].

The aforementioned aspects include the idea of engagement, as it is an effective participation that requires activity and a sense of meaning and feelings, where dividing the concept of student engagement into multiple features enriches the information because it allows clarifying the term in a more clear and practical way, as it has become easier to measure student engagement or testing it experimentally, which included an important note, that is the students’ focus on the task, investing in effort, and continuing to face difficulties. Reeve (2012) presents a model for the dimensions of engagement during the process of effective learning, where the model is characterized by four distinct features, but they are very closely related with each other and complement to each other [22].

6. Method and procedures

6.1. Curriculum:

The data collected will be analyzed through the questionnaire that adopted the (MSLQ) scale for each of (Pintrich & De Groot 1990) using the descriptive analytical method to verify paragraph discrimination and internal consistency, and to identify indicators of validity and reliability of the tools adopted in statistical application.

6.2. The study population and its sample

The study community represents students of the Department of Architecture at Mustansiriyah University and the choice of the research sample represented by the third stage students at the Engineering Department, where they numbered (15) students, with an average of five students to ten students, they were divided into five groups for each group three students, the groups were diversified in their formation. The groups (1, 4 and 5) were females and the group (2) were males, while the group (3) groups were mixed. The purpose of the various divisions was to investigate the gender difference factor on the results, although it was not with a significant effect. Questionnaire forms were distributed, which represent two measures, the first relates to the features of the engagement consisting of (24) questions, while the other scale included a set of measures for multiple variables, including the strategy of cooperative learning, which was adopted by the current research as an influencing factor on
the process of academic engagement, and the results were analyzed through the use of the SPSS statistical program according to the descriptive-analytical method as shown below:

6.3. Statistical analysis of the field aspect

6.3.1 Validity and reliability tests of the measuring instrument

The content validity test is used in comparison with the peripheral to show the sincerity of the questionnaire paragraphs in the representation of cooperative and academic engagement the best representation, while the stability test through the use of the stability factor (Cronbach's Alpha) confirms the reliability of the data we get from the sample, after applying the steps of the two tests the results were on As follows:

A- Content validity test for independent variable clauses (cooperative learning)

Table (1) demonstrated the value of the stability parameter (Cronbach's Alpha) for the total questionnaire items is equal to (0.763) which is more than (0.700), which confirms that the questionnaire items have passed the reliability test successfully, indicating that there is a high stability in the overall questionnaire items. Table 1 showed also that the questionnaire items have successfully passed test of validity, as the criterion of truth test was recorded (0.873), to confirm that the questionnaire items represent the title of the research (the effect of cooperative education strategies on academic integration) as the best representation.

| Search variables   | Reliability test | Validity test |
|--------------------|------------------|---------------|
|                    | Cronbach's Alpha | T-Test        |
|                    | Probability value | Significant level | Probability value | Significant level | Calculated |
| The requirement of reliability & validity was achieved in the paragraphs of the independent variable | 0.792 | 0.00 | 7.618 | Academic engagement | Y |
| Verification of the requirement of reliability & validity in the paragraphs of the dependent variable | 0.00 | 0.00 | 7.618 | Academic engagement | Y |
| The entirety of the paragraphs of the questionnaire | The value of the tabular T at a level (0.05) was 2.447 (significant) |

6.3.2 Descriptive analysis of research variables

At the stage of descriptive statistical analysis of the data that have been obtained from the respondent, the author has adopted the questionnaire, which is in turs relied on weighted mean and standard deviations and the relative importance of each of the items of cooperative education strategies and academic engagement. As for assessing the response direction, the author has relied on a hypothetical
medium of (3), which represents the boundary between agreement and disagreement within the quintet Likert scale. As for displaying the respondent’s response level to the questionnaire items, the author used the response strength matrix as shown in Table (2).

**Table 2. Response Force Matrix on the questionnaire items**

| The weighted mean value restricted to a period | The strength of response to the items of the questionnaire | Level of response by the respondent |
|---------------------------------------------|----------------------------------------------------------|----------------------------------|
| 1 to < 1.8                                   | Failure to agree completely                              | Low                              |
| 1.8 to < 2.6                                 | Lack of agreement                                        | Medium                           |
| 2.6 to < 3.4                                 | Neutrality                                               | High                             |
| 3.4 to < 4.2                                 | The agreement                                            |                                   |

It is clear from Table (2) that if the weighted mean value is between (1 to less than 1.8), then the response strength means total disagreement. If the value of the weighted mean (from 1.8 to less than 2.6), then the response strength means disagreement, while if the weighted mean value ranges (from 2.6 to less than 3.4), then the response strength leads us to neutrality, whereas if the weighted mean value ranges (from 3.4 to less than 4.2), then the response strength means agreement. If the weighted mean is (4.2 to 5), then the response strength leads us to full agreement. In particular, the category length in the response force matrix was calculated by the formula that divides (the highest value the scale used in the study is subtracted by one true = 4) by (the highest value taken by the scale = 5), and thus the category length is equal to (0.8).

If the weighted mean is between 1 to less than 2.6, then the response level is low, while if the weighted mean is between (2.6 to less than 3.4), the response level is medium, whereas the response level will be high if the weighted mean is between (3.4 to 5). The results of the descriptive analysis of the study variables were as follows:

Table (3) indicates that the value of the weighted arithmetic mean of the cooperative education strategy as the independent variable was recorded (3.1143) which is greater than the value of the hypothetical mean that represents the boundary between agreement and disagreement of (3), to confirm that the responses of the study sample regarding the cooperative education strategy went towards Neutrality, while the weighted mean value of the cooperative education strategy within the category was between (from 1.8 to less than 2.6) in the respondent strength matrix, indicating the level of response of the respondent to most of the cooperative education strategy questions was at a low level, and a standard deviation of (1.427) , And no Thus, there is a noticeable dispersion in the answers of the study sample regarding the questions of the cooperative education strategy, while the relative importance of the independent variable (62.29%) was recorded, indicating that more than half of the study sample agreed on the questions of the cooperative education strategy.

The levels of significance of cooperative education strategy items clauses were distributed among the highest response level by the respondent, the first question (I enjoyed cooperative learning with my colleagues in the design studio) among all questions of the independent variable with a weighted arithmetic mean of 4.000 and the standard deviation was recorded (1.254), and relative importance formed (80%) to confirm this agreement with most Study sample members on the importance of the first question.

While table (3) highlighted that the fourth question (The mutual benefit of cooperative learning is few for me) has achieved the lowest level of response among all questions of self-organization, as the value of the weighted mean was (2.5333) and the standard deviation was recorded (1.506), and relative importance formed (50.67%) to confirm this more agreement Of the half of the study sample for the fourth question.

It can be concluded from Table (4) that the value of the weighted mean for the academic engagement was (3.7131), which is greater than the value of the hypothetical mean, to show that the answers of the study sample regarding academic integration tended towards agreement, while the value of the weighted mean for academic engagement was within the category between (3.4 - 4.2) in the matrix of
the response force of the respondent, to confirm the level of response of the respondent on most items of academic engagement with a high level with a standard deviation of (0.959), which indicates a noticeable dispersion in the responses of the study sample regarding the items of academic engagement, while recording the relative significance of the dependent variable (74.26 %), Indicating that most of the study sample agree with the items of academic engagement.

Table 3. the level of significance of the independent variable of the cooperative education strategy

| Response level of response | relative significance % | standard deviation | weighted mean | I totally do not agree | I do not agree | neutral | I agree | I totally agree | Type of statistical scale | code |
|----------------------------|-------------------------|-------------------|---------------|-----------------------|---------------|---------|---------|-----------------|--------------------------|------|
| high                       | 80                      | 1,254             | 4,0000        | 1                     | 1             | 2       | 4       | 7               | no                       | Q1   |
| Average                    | 68                      | 1,242             | 3,9000        | 3                     | 2             | 4       | 4       | 2               | no                       | Q2   |
| low                        | 50,67                   | 1,506             | 2,5333        | 6                     | 1             | 4       | 2       | 2               | no                       | Q4   |
| Average                    | 72                      | 1,352             | 3,6000        | 7                     | 1             | 5       | 1       | 6               | no                       | Q6   |
| Average                    | 53,33                   | 1,589             | 2,6667        | 6                     | 1             | 2       | 4       | 2               | no                       | Q7   |

Academic engagement levels were distributed among the highest response level by the respondent achieved by question fifteen (I help my classmate design class when they need my help) among all questions of the dependent variable with a weighted arithmetic mean of (4.6667), with a standard deviation of (0.617), and relative importance that made up (93.33%), while a table indicated (93.33%).

4) To Question Nineteen (During my studies, I extracted logical ideas) achieved the lowest level of response between the questions of academic engagement, as the value of the weighted arithmetic mean was (1.7333), and the standard deviation for the same question was (0.844), and relative importance was (34.76%).

Table 4. the significance level of the dependent variable of the academic engagement

| Code | Weighted Mean | Std. Deviation | The relative significance | Level of Response |
|------|---------------|----------------|--------------------------|-------------------|
| Q10  | 4.2000        | 0.775          | 84                       | High              |
| Q11  | 3.7333        | 0.884          | 74.67                    | High              |
| Q12  | 4.2667        | 0.799          | 85.33                    | High              |
| Q13  | 3.4667        | 1.685          | 69.33                    | High              |
| Q14  | 3.1333        | 1.685          | 62.67                    | Medium            |
| Q15  | 4.6667        | 0.617          | 93.33                    | High              |
| Q16  | 4.5333        | 0.516          | 90.67                    | High              |
| Q17  | 3.5333        | 1.060          | 70.67                    | High              |
| Q18  | 1.9333        | 1.223          | 38.67                    | Low               |
| Q19  | 1.7333        | 0.884          | 34.67                    | Low               |
| Q20  | 2.1333        | 1.302          | 42.67                    | Low               |
| Q21  | 4.4000        | 0.632          | 88                       | High              |
| Q22  | 3.7333        | 0.961          | 74.67                    | High              |
| Q23  | 3.9333        | 1.0363         | 78.67                    | High              |
| Q24  | 4.0667        | 1.163          | 81.33                    | High              |
| Q25  | 4.2000        | 0.676          | 84                       | High              |
| Q26  | 4.2000        | 0.862          | 84                       | High              |
| Q27  | 3.6000        | 1.056          | 72                       | High              |
| Q28  | 4.0000        | 1.134          | 80                       | High              |
| Q29  | 3.6667        | 0.817          | 73.33                    | High              |
6.3.3. Statistical tests

It is deduced from Table (5) the acceptance of the first main hypothesis which states (there is a significant statistical correlation between the strategy of cooperative education and academic engagement) with a confidence rate (95%), as the calculated value of T was (3.885) which is significant, because it is greater than the value of the tabular value of (2.16) at the level of significance (0.05), while the value of the simple correlation coefficient (Correlation coefficient Spearman) between the strategy of cooperative education and academic engagement was (0.733), indicating a strong correlation between the two variables.

Table 5. The correlation test between cooperative education strategy and academic engagement

| The assumption | Variables | Correlation coefficient Spearman | F - Test | The Author comment |
|----------------|-----------|----------------------------------|---------|--------------------|
| The First primary Cooperative education strategy Academic engagement | 0.733 | 3.885 | Acceptance of the assumption with 95% level of confidence |

The tabulated value of F at the level of significance (0.05) equals to (2.16)

Table (6) showed the extent of acceptance of the second main hypothesis, which stated that (there is a significant statistical effect between the cooperative education strategy in academic engagement) with a confidence rate of (95%), as the calculated value of F was (14,649), which is significant, because it is greater than the value of the tabular F of (4.6672) at the level of significance (0.05), while the coefficient of determination was (53%), indicating a rate of the effect of the cooperative education strategy on academic engagement.

Table 6. The effect of self-efficacy testing on academic engagement

| The assumption | Variables | The coefficient of determination $R^2$ | F - Test | The Author comment |
|----------------|-----------|----------------------------------------|---------|--------------------|
| The second primary Cooperative education strategy Academic integrity | 53% | 14,649 | Acceptance of the assumption with 95% level of confidence |

The tabulated value of F at the level of significance (0.05) equals (4.6672)
7. Discuss the results
Statistical analysis of the questionnaire for research variables, which includes the cooperative learning strategy and academic integration, has demonstrated a significant statistically significant correlation between cooperative learning strategy and academic integration with a moral impact among the two variables, and therefore we infer that the cooperative learning strategy is one of the effective variables and influencing the process of academic integration that contributes to The students merged with the design lesson as the heart of the Department of Architecture, which enhanced the results of the students in the project, which reflected positively on their degrees, and also contributed to strengthening the spirit of cooperation with peers as well as professors. Supporting the self-organization of the acquired knowledge that contributes to managing the design process and managing the time required for achievement, as well as the positive social ties that have arisen between students and who have gone out of their desire to work together in the future, and therefore the use of cooperative learning strategy has affected behavioral integration through participation, achievement and emotional integration through cooperation The social relationships that governed group work, as well as cognitive integration through knowledge acquisition related to design, problem solving, detail processing, critical thinking and other cognitive gains, and enabling students to manage the process of learning Important by merging with delegation and thus achieving cognitive and social achievements at the level of design studies and at the level of students.

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