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PAPER

The Impact of Two Proposed Strategies Based on Active Learning on Students' Achievement at the Computer and Their Social Intelligence

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ABSTRACT

Active learning is a teaching method that involves students actively participating in activities, exercises, and projects within a rich and diverse educational environment. The teacher plays a role in encouraging students to take responsibility for their own education under their scientific and pedagogical supervision and motivates them to achieve ambitious educational goals that focus on developing an integrated personality for today's students and tomorrow's leaders. It is important to understand the impact of two proposed strategies based on active learning on the academic performance of first-class intermediate students in computer subjects and their social intelligence. The research sample was intentionally selected, consisting of 99 students. The experimental group comprised 33 students from division (B) who were taught according to the first proposed strategy, while the second experimental group, represented by division (A), and also consisted of 33 students. The control group, made up of 33 students from division (C), was taught using the usual method. Two tools have been prepared: an achievement test with 40 items and a measure of social intelligence consisting of 20 items. The research results indicated that the experimental groups, which utilized the first and second proposed strategies based on active learning, outperformed the control group. As a result, several conclusions, recommendations, and proposals were made.

KEYWORDS

impact, proposed strategy, active learning, achievement, social Intelligence, computer, students, secondary

1 INTRODUCTION

Active learning is a contemporary learning approach that offers students a valuable opportunity to engage, interact, and collaborate. It is rooted in experiential practice, is practical and transferable, and fosters the cultivation of cooperative

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relationships among students. This, in turn, contributes to the development of their social intelligence and facilitates holistic student development. It is considered a new educational philosophy based on promoting student positivity in various educational settings [1, 2]. Therefore, the teacher had to implement modern educational strategies based on active learning to engage students and enhance their academic achievement, particularly in the computer curriculum. The nature of the curriculum content necessitates modern strategies that facilitate effective planning and teaching of computer subjects, moving away from traditional presentation methods [3–5].

The theoretical significance of this research stems from being the first study, to the best of the researchers' knowledge, to examine the effects of two proposed active learning strategies on students' academic performance and social intelligence in computer-related subjects. Shedding light on contemporary strategies rooted in active learning is a trend that aligns with modern developments in the field of curriculum and teaching methods. In terms of its practical significance, it can help in incorporating strategies centered on active learning when designing and enhancing computer curricula by those tasked with implementing them in the future. Motivating teachers to incorporate active learning strategies in teaching computer content involves creating a learning environment that includes activities to engage students and develop their social intelligence [6].

The research was limited to female students in the first intermediate grade in the daytime intermediate and secondary schools of the General Directorate of Education, Al-Rusafa, during the second semester of the academic year 2022–2023. The third and fourth units of the computer book for intermediate first-grade students, issued by the Iraqi Ministry of Education/General Directorate of Curriculum, include a section on social intelligence, which comprises four domains: social relations, teamwork, social responsibility, and leadership.

This research aims to investigate the impact of two proposed strategies, based on active learning, on the academic performance of first-class intermediate students in computer subjects and their social intelligence. This is accomplished by answering the following two questions:

a) What is the impact of two proposed active learning strategies on the academic performance of first-class intermediate students in computer science?
b) What is the impact of two proposed strategies utilizing active learning on the social intelligence of first-year intermediate students in computer science?

2 THEORETICAL BACKGROUND

2.1 Active learning strategies

A strategy encompasses the procedures and practices that a teacher employs to attain the desired outcomes aligned with the set goals. It encompasses the activities, resources, and assessment methods aimed at achieving the specified objectives [7, 8]. The strategy outlines the essential steps devised by the teacher to fulfill the curriculum objectives and encompasses every deliberate action or procedure with a specific purpose or goal. Therefore, the strategy, in its broadest sense, encompasses everything that the curriculum teacher does to achieve the objectives [9, 10]. Researchers propose a procedural approach for teaching computer subjects to first- and intermediate-grade students, involving a series of steps. The researchers procedurally define

the proposed strategy as a set of steps followed to teach the third and fourth units in the computer subject to first- and intermediate-grade students.

Active learning strategies are educational practices that teachers implement in the classroom. These strategies depend on the students' activity, effectiveness, and positivity, as they are responsible for their own learning and have the ability to make decisions about it. In turn, the teacher encourages the student to work collaboratively through educational activities aimed at supporting their intelligence and social development [11].

The implementation of active learning enhances students' motivation, considers their readiness and inclinations, and encourages them to explore and apply information. This approach focuses on the student's engagement, going beyond passive listening to the lesson, and instead creates a conducive learning environment that facilitates positive learning [12–14].

Strategies and steps. The steps to implement the first proposed strategy were as follows:

1. Determine the concepts that need to be taught to students.
2. The teacher asks the students targeted questions about the concepts identified earlier.
3. During the lesson, an educational video is presented, and students are then prompted to concentrate on the video and promptly jot down their thoughts in textual or symbolic form, or as diagrams and drawings.
4. After a minute, the teacher asks the students to discuss the collectively written ideas in order to arrive at accurate answers to the posed questions.
5. Providing an activity to reinforce the concepts covered in the lesson.
6. The students collaborate to address an issue related to the subject of the lesson from four different perspectives: a problem in the community, the effects resulting from the problem, the causes leading to the problem, and the proposed solutions. They then document their findings appropriately, either on an activity sheet or in an exercise book [15, 16].

These are the steps to implement the second proposed strategy by the teacher:

1. Dividing the students into groups and then presenting the topic of the lesson. Each group is asked to write down everything they know about the topic. (What do you know about the topic of the lesson?) in the first column of a table that the teacher prepared in advance and distributed to groups of students.
2. Asking each group to write down everything they would like to know about the subject of the lesson in the field (What would you like to know about the subject of the lesson) in the second column of the table.
3. Display a set of pictures along with an educational video, and ask the students to write down all the new information they learned in the lesson.
4. Selecting a student from each group to discuss what was written in the box (what did you learn about the topic of the lesson?) with the potential to involve the group members in the conversation.
5. After completing the task, the members of each group discuss the information written in the box about the other groups' findings. They share what they have learned about the topic of the lesson. In the third column of the table.
6. The teacher distributes a table and an activity sheet to each group. The table includes a series of concepts related to the topic of the lesson. The activity sheet contains the criteria or categories used to classify the concepts and to provide

answers under the teacher's supervision. Each group is also required to research additional information related to the subject, as long as it is not covered in the lesson, and record it in the "How you can learn more about the subject of the lesson" box in the fourth column of the table [17].

2.2 Social intelligence

It refers to the ability to comprehend others and collaborate with them, to discern their moods, differentiate between them, and understand their intentions, motives, and emotions. It is reflected in an individual's capacity to comprehend others, articulate their needs, establish connections, adapt to them, and interact with them, as well as collaborate in groups [18, 19]. Engaging students in collaborative activities to share knowledge among themselves can only cultivate this type of intelligence [20, 21]. It is the degree obtained by intermediate first-class students in the measure of social intelligence, reflecting their ability in the following areas: social relations, teamwork, social responsibility, and leadership [22].

Active learning strategies emphasize the student's role as an active participant within the learning group in the classroom. According to researchers, this approach can have a positive impact on the development of students' social intelligence, which is the focus of this research.

Domains of social intelligence. The following areas have been adopted:

1. The field of social relations is reflected in the establishment of relationships among female students and the maintenance of amicable connections between them, even when disagreements arise [23].
2. The field of collaborative work focuses on accomplishing tasks or achieving common goals among two or more students, as well as on developing social communication skills [24].
3. The field of social responsibility focuses on students' readiness and willingness to accept the consequences of their behavior with a strong sense of commitment [25, 26].
4. The field of leadership focuses on the student's influence on her colleagues through guidance and counseling to promote cooperation and achieve work goals [27–29].

2.3 Related work

Table 1 provides the details of studies dealing with research variables.

Table 1. Studies dealing with research variables

Name; Year; Country	Subject	Class	Sample	Curriculum Type	Tools	Results
[30]	Math.	10	50	Experimental	The Likert scale	The discovering showed that the students in the active learning group had auspicious attitude than students in the conventional teaching group.
[31]	Mathematics	7	60	Experimental with post-test	– Achievement test – Visual intelligence test	Students of "experimental group" who studied based on proposed strategy outperformed on those who by traditional.

3 METHODOLOGY

Researchers chose the experimental approach, which is characterized by using experiments as a tool to validate hypotheses [32]. The experimental design with partial control on a dimensional scale was chosen for three groups: two experimental and one control, as shown in Table 2.

Table 2. The experimental approach

Groups	Equivalence	Methods of Teaching	Dependent Variable	Tools
Exp. 1	Chronological age Previous achievement intelligence Previous mathematical knowledge	Proposed Str. 1	achievement Social Intelligence	achievement test social intelligence scale
Exp. 2		Pro. Str. 2		
Con.		Regular one		

The research population consisted of female students in the first intermediate class in the secondary and high school affiliated with the GDE, Rusafa First/Baghdad, for the academic year 2022–2023. The experiment was conducted at Haneen for Girls High School, with the research sample distributed among three groups, each consisting of 33 students. Therefore, the sample size for the current research was 99 students. The three groups were assessed based on variables such as intelligence, chronological age, previous knowledge, and previous achievement. The results indicated that all groups were equivalent in terms of these variables.

3.1 Achievement test

The main objective is to assess students' understanding of the topics covered in the computer book scheduled for the academic year 2022–2023, based on the behavioral objectives previously established for that educational content. The scientific material to be studied by the two research groups was selected, and behavioral objectives were then derived from the prescribed content of the computer book for the first intermediate grade. These behavioral objectives were identified based on the input of both arbitrators and specialists, resulting in 150 behavioral objectives distributed across the levels of Bloom's classification (remember, understand, and apply).

Researchers created a table of specifications based on the units to be taught, taking into account the content of the educational material and formulating behavioral objectives in light of the educational material, and the behavioral objectives were formulated according to Bloom's levels of cognitive objectives (remember, understand, and apply). The next steps involved determining the number and type of paragraphs and, finally, constructing the specification table. In preparing, the researchers consulted with a number of experts in teaching methods and computer science teachers for the first intermediate class to determine the number of items for the achievement test. It was agreed that 40 test items for the chapters included in the research are suitable for the test. As a result, two types of questions were formulated: the first type is objective, and the second type is subjective. The test instructions guide students through the test, recording both correct and incorrect answers. The achievement test included 30 multiple-choice paragraphs and ten essay questions, with a maximum score of 50 points for the multiple-choice section and 80 points for the entire test.

Validity and reliability.

1. Virtual: The researchers presented the achievement test paragraphs, along with the behavioral purposes for each paragraph, to a group of arbitrators specializing in teaching methods and subject teachers. This was done to ensure the integrity of the paragraphs, the clarity of their wording, and the objectivity and attractiveness of the alternatives. (80%) or more.
2. Content: This was accomplished by preparing the specifications table.

The stability coefficient of the achievement test, calculated using the Alpha-Cronbach equation, was 0.90, indicating strong stability as it exceeded the acceptable stability criterion of 0.80 for statistical analysis samples.

3.2 Social intelligence test

The social intelligence scale was developed to measure the level of social intelligence among female students in the first intermediate class. Previous studies were reviewed in order to categorize areas and develop paragraphs. The scale consisted of 20 paragraphs for each domain, in line with theoretical definitions. Four paragraphs were presented to arbitrators for their opinions and observations, each focusing on a different area. The paragraphs were modified, and all of them received an agreement of over 80%. The scale was designed to measure social intelligence among first- and intermediate-grade students.

The social intelligence scale has been updated to include three options based on the triple Likert scale, with positive scores (1, 2, 3) and negative scores (3, 2, 1) [33]. The validity of the scale was verified through two types of validity: face validity, where paragraphs received over 85% agreement from arbitrators, and construct validity, where the internal consistency of the scale was confirmed by finding the correlations. Coefficients. There should be a comparison between each paragraph with the domain's levels, the scores of the domain with the overall scale, and the domains with the total score. All the paragraphs are statistically significant.

The social intelligence scale was utilized in an exploratory survey to assess the time required for students to respond to all scale paragraphs, ensuring clarity. The survey involved 30 students from the 1st intermediate grade at Seef Al-Arabi for Girls, which is affiliated with the General Directorate of Education of Baghdad/Al-Rusafa 1st. The average time for students to answer all the paragraphs was calculated to be 30 minutes. After applying the social intelligence measure to the information sample, the scale was reapplied for analysis. The statistical analysis included 100 female students from the first intermediate class at Bilqis for Girls Secondary School.

The researchers administered a social intelligence scale to a sample and performed statistical analysis. They corrected the students' answer sheets, calculated the final scores, and arranged them in descending order. They analyzed the scores of the highest and lowest groups using a t-test for two independent samples. All items were statistically significant at the 0.05 level with 52 degrees of freedom. The stability coefficient for the scale was calculated using Cronbach's alpha equation and yielded a value of 0.86. The discriminatory power was determined using a t-test for two independent samples.

4 RESULTS

The research aimed to assess the effectiveness of two active learning strategies on social intelligence for first-year female students, with the null hypothesis

stating: "*There is no statistically significant difference at the 0.05 level of significance between the mean scores of the students in the three research groups in the achievement variable.*"

It used one-way analysis of variance (ANOVA) to determine the differences among three research groups. The calculated p-value was greater than the tabular value at a significance level of 0.05, indicating a statistically significant difference in the achievement variable, as demonstrated in Table 3.

Table 3. (ANOVA) for the three research groups in the achievement variable

Source of Variance	Sum of Var.	DF	Mean of (Sum of Var.)	F-value		Statistical Significance at the Level (0.05)
				Cal.	Tab.	
Between groups	8078.337	2	8403.619	103.109	3.11	Significance
Within groups	3446.872	96	39.169			

The researchers used the Scheffe test to ascertain the direction of differences among the three research groups in this variable (Table 4).

Table 4. Comparison analysis between the three research groups using the Scheffe scale

Groups	Averages	The Scheffe Value Calculated	F-tabular	The Statistical Significance is at the Level of 0.05
Experimental One	68.1	22.99	3.11	Indication
Control	45.20			
Experimental Two	57.80	12.53	3.11	
Control	45.20			
Exp. 1	68.1	10.44	3.11	
Exp. 2	57.80			

Table 4 shows that the Scheffe value comparing the mean scores of students in the first experimental group with the average scores of the control group in the achievement variable is higher than the tabular p-value. This indicates a statistically significant difference in favor of female students. The same value is also observed in the second experimental group, indicating a statistically significant difference in favor of female students at the 0.05 significance level. The effect size of the first proposed strategy, which is based on active learning, on the achievement of students in the experimental group was compared to the control group. The students in the control group studied in the usual way. The calculated effect size was 0.89, indicating a large effect size. This indicates that the initial proposed strategy had a significant impact on the academic performance of the students in the experimental group.

4.1 Achievement results

The research reveals that the experiment. The experimental group was more effective than the control group due to the use of active learning strategies. These strategies organized the scientific material in a clear, logical, and sequential manner, thereby enhancing the meaningfulness of the learning process. This may be attributed to the clear, logical, and sequential steps of the lesson.

"The 2nd null hypo; there is no statis. Signify. differ. at the level of significance (0.05) between the average scores of the students in (3 research groups) on the social intelligence scale".

Researchers used ANOVA to identify differences among three research groups in social intelligence. The calculated p-value was greater than the tabular value, indicating a statistically significant difference between the groups, as shown in Table 5.

Table 5. One-way ANOVA for the three research groups in the social intelligence

SV	SS	DF	M	F-value		Statistical Significance at the Level (0.05)
				Calculated	Tabular	
Between groups	5372.747	2	2686.374	24.261	3.11	Statistically significant
Within groups	10629.758	96	110.727			

To determine the direction of the differences between the three research groups in this variable, the researchers utilized the Scheffe Test to identify these distinctions (Table 6).

Table 6. The Scheffe scale the compared of social intelligence measures for three research groups

Groups	Means	Calculated Schiffe Value	F-tabular	Statistical Significance at the Level (0.05)
Exp. 1	45.0909	40.04	3.11	Statistically significant
Con.	28.6970			
Exp. 2	43.4242	32.32		
Con.	28.6970			
First Exp.	45.0909	0.414		
Second Exp.	43.4242			

It is clear from Table 6 above that the calculated Scheffe V value is greater than the tabular p-value for the social intelligence variable. The Scheffe value calculated between the mean scores of the students in the first experimental group and the average scores of the students in the second experimental group for the variable of social intelligence is greater than the tabular p-value. The indicates a statistically significant difference at the 0.05 significance level, favoring and in favor of the students in the first experimental group. The effect size (ES) was 0.85, which is considered to be large.

4.2 Social intelligence findings

The results of the current research clearly indicate that the experimental group, which was taught using the first and second proposed strategies based on active learning, outperformed the control group, which was taught in the traditional manner. The reason for this superiority may be that the steps of the lesson, according to the two proposed strategies, focused on organizing the content of the scientific material. This, in turn, helped the learning to be meaningful to the students and made it easier for them to understand the main and subsidiary ideas, leading to better comprehension. Additionally, both strategies involve group work among students [34] and the use of worksheets with diverse questions to engage students,

encourage acceptance of others' opinions in the classroom, and enhance focus and awareness of the scientific subject. These approaches have resulted in increased knowledge and improved performance in social intelligence assessments.

5 CONCLUSIONS

The proposed active learning strategies have been shown to be effective in increasing social intelligence among students in the experimental groups compared to the control group in computer science. These strategies encourage students to actively seek information related to the subject, placing them at the center of the educational process.

6 RECOMMENDATIONS

The researchers recommend incorporating the proposed strategies for active learning into computer education at the second intermediate grade and other academic levels. This is based on their significant role in enhancing scholastic social intelligence, as indicated in the current research. The study proposes examining the effectiveness of these strategies across various educational stages and conducting a comparative analysis of the effectiveness of the suggested strategies for active learning in social intelligence among male and female students.

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