The Impact of Cooperative Learning Strategies on Enhancing Interaction Among Intellectually Disabled Students Integrated into Inclusive School Classrooms

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Abstract: Cooperative learning strategies are modern educational approaches aimed at enhancing social interaction among students, especially in inclusive education settings for children with intellectual disabilities. This study aims to evaluate the impact of cooperative learning strategies on improving social interaction between students with intellectual disabilities integrated with their peers without disabilities in inclusive schools.

The study sample consists of **100 students** with intellectual disabilities from inclusive schools in Algiers, in addition to **20 teachers** specializing in teaching children with intellectual disabilities. Data were collected using questionnaires and direct observations, and analyzed using statistical methods such as the independent samples t-test, ANOVA, and Pearson's correlation test.

The study concluded that cooperative learning strategies have a statistically significant positive effect on improving social interaction between students with intellectual disabilities and their peers without disabilities. The results also showed a strong relationship between teachers' competence in implementing cooperative learning strategies and the level of social interaction among students with intellectual disabilities.

The main recommendations emphasize the need to train teachers in cooperative learning strategies and expand the implementation of these strategies in inclusive schools to create a supportive educational environment that fosters social interaction and integration between students with intellectual disabilities and their peers.

Keywords: Strategies; Cooperative Learning; Social Interaction; Intellectual Disability, School Inclusion.

Keywords: keyword; keyword; keyword; keyword; keyword.

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1 – Introduction

The introduction text is written in Traditional Arabic, size 13, line spacing 1 (this format applies to all the manuscript text). The author of the article shows the broad area of the subject and its specific topic so as to reach to the background information that accurately describes the problem. S/he presents the problem in the form of a single question and the hypothesis(es) underlying it (the assumed possible answer), in addition to the directly related previous research and studies that have dealt with the subject. These are written in a concise sequential and scientific way through which the researcher shows similarities and differences in terms of purpose, sample, study variables, method and tools used, and findings.

2-Problem Statement

Cooperative learning is a modern educational strategy that has proven its effectiveness in promoting both academic and social learning among students (Slavin, 2011, p. 34). For students with intellectual disabilities integrated into inclusive school classrooms, cooperative learning can serve as a tool to enhance social interaction and develop life skills, fostering a sense of belonging within the school community. However, achieving this goal requires a deep understanding of the challenges faced by these students and the educators who work with them.

Studies indicate that students with intellectual disabilities encounter significant difficulties in interacting with their peers due to gaps in social and emotional skills (Friend & Cook, 2010, p. 125). These gaps may result in social isolation and feelings of inadequacy among these students, hindering the objectives of inclusive education (Hallahan, Kauffman, & Pullen, 2015, p. 243). Conversely, cooperative learning enhances opportunities for social interaction by engaging all students in group activities that encourage collaboration and participation (Johnson & Johnson, 2009, p. 78).

In addition to its academic and social benefits, cooperative learning fosters the acceptance of students with disabilities by their peers, leading to a more inclusive and integrated environment (Salend, 2016, p. 317). However, the effectiveness of these benefits hinges on the successful design and implementation of cooperative learning strategies. Implementing such strategies without considering individual differences and the needs of students with disabilities may yield adverse results, such as reinforcing exclusion or failing to achieve the desired level of interaction.

Other challenges in cooperative learning strategies include the pivotal role of the teacher in planning and supervising group activities to ensure active participation from all students. Moreover, some studies highlight that the lack of teacher training in applying these strategies with students with intellectual disabilities may impede the achievement of desired goals (Turnbull, Turnbull, & Wehmeyer, 2019, p. 202).

Accordingly, this study underscores the importance of evaluating the impact of cooperative learning strategies on enhancing social interaction among students with intellectual disabilities and their peers in inclusive classrooms. The study also aims to propose innovative and applicable strategies for diverse educational contexts and provide recommendations for developing teacher training programs to enhance the effectiveness of these strategies.

The literature indicates that social interaction in inclusive settings is heavily reliant on the effectiveness of the educational strategies employed (Foreman, 2017, p. 88). In this context, cooperative learning can act as a bridge to narrow the gaps between integrated students and their peers by creating a participatory learning environment that encourages mutual respect and assistance (Sharan, 2010, p. 412).

Nonetheless, the success of these strategies is contingent on several factors, such as teachers' awareness of the importance of cooperative learning and their ability to manage group activities while considering individual differences among students (Gargiulo & Metcalf, 2013, p. 195). Group dynamics also play a crucial role in influencing the effectiveness of social interaction. Forming imbalanced groups or neglecting the needs of students with disabilities may exacerbate exclusion rather than promote inclusion (Gillies, 2016, p. 229).

Research further shows that successful social interaction is not limited to group activities but also depends on the continuous support provided by teachers, whether through direct interventions during activities or by creating a supportive and empathetic classroom environment (Lingo, Barton-Arwood, & Jolivette, 2011, p. 149). This highlights the importance of developing specialized training programs aimed at equipping teachers with the necessary skills to effectively implement cooperative learning with students with intellectual disabilities.

Additionally, the absence of clear evaluation tools to measure the impact of cooperative learning strategies on social interaction complicates the understanding of their success, necessitating the development of comprehensive measurement tools based on precise scientific criteria (Kagan, 2009, p. 63). Consequently, this study represents a step towards bridging this research gap by providing a scientific analysis of the role of cooperative learning in enhancing interaction among students with intellectual disabilities and their peers in inclusive classrooms.

3-General Hypothesis

There is a statistically significant impact of cooperative learning strategies on improving social interaction among students with intellectual disabilities integrated into inclusive school classrooms.

4-Specific Hypotheses

1. There is no statistically significant difference in the level of social interaction before and after the application of cooperative learning strategies.
2. There is no statistically significant difference in the social interaction between students with intellectual disabilities and their non-disabled peers after applying cooperative learning strategies.
3. There are no statistically significant differences in social interaction between students in classrooms applying cooperative learning strategies and those not applying them.
4. There is no statistically significant relationship between teachers' competency in applying cooperative learning strategies and the level of social interaction among students with intellectual disabilities.

5-Study Objectives

1. To identify the impact of cooperative learning strategies on improving social interaction between students with intellectual disabilities and their non-disabled peers in inclusive school classrooms.
2. To examine the relationship between teachers' competency in implementing cooperative learning strategies and the level of social interaction among students with intellectual disabilities.
3. To compare the level of social interaction among students with intellectual disabilities in classrooms that implement cooperative learning strategies with those that do not.

4. To explore the challenges and factors influencing the implementation of cooperative learning strategies in inclusive schools and their effect on social interaction among students.
5. To provide recommendations for enhancing cooperative learning strategies to better serve social interaction among students with intellectual disabilities and promote their integration into the school environment.

6-Study Significance

1. **Educational Significance**: The study contributes to understanding the role of cooperative learning strategies in improving social interaction among students with intellectual disabilities and their peers, thereby enhancing the process of inclusive education and achieving its educational and social goals.
2. **Practical Significance**: The study aims to offer practical solutions through the improvement of cooperative learning strategies, ensuring a more supportive educational environment for students with intellectual disabilities and enhancing their interactions with others.
3. **Scientific Significance**: This study enriches scientific research in the field of special education by providing applicable findings on how to enhance social interaction using cooperative learning strategies.
4. **Social Significance**: By improving social interaction between students with intellectual disabilities and their non-disabled peers, the study promotes values of social inclusion and integration in the school community, fostering acceptance of diversity and reducing discrimination.

7-Study Population and Sample

7.1- First: Study Population

The study population includes all individuals directly or indirectly related to the study's subject on the impact of cooperative learning strategies on improving social interaction among students with intellectual disabilities integrated into inclusive school classrooms. It comprises:

1. **Students with Intellectual Disabilities**:
    - Students with intellectual disabilities participating in school inclusion programs in Algerian schools.
    - Distributed across various primary education levels (grades 1 to 5) in inclusive schools.
    - Including students of different age groups and degrees of intellectual disabilities.
2. **Specialized Teachers**:
    - Teachers working with students with intellectual disabilities in integrated classrooms.
    - Selected teachers who utilize cooperative learning strategies with students with intellectual disabilities.
3. **Regular (Non-Specialized) Teachers**:
    - Teachers teaching regular students in classrooms that include students with intellectual disabilities.
    - These teachers participate in applying cooperative learning strategies with students with intellectual disabilities.
4. **School Administrators**:
    - School principals and supervisors overseeing inclusion programs who provide a suitable environment for integrating students with intellectual disabilities.

- This group includes those responsible for coordinating inclusion efforts within schools.

7.2- Second: Study Sample

The study sample includes students and teachers in inclusive schools, enhancing the reliability of the results and ensuring representation of various groups involved in social interaction through cooperative learning strategies. A stratified random sampling method was used to ensure representation of all relevant categories in the study.

1. **Sample Size**:
   - A sample of 100 students with intellectual disabilities integrated into inclusive schools in Algiers, distributed across primary education levels.
   - 20 specialized teachers in teaching students with intellectual disabilities, along with 10 regular teachers participating in applying cooperative learning strategies.
   - 5 school principals or supervisors overseeing inclusion programs in integrated schools.
2. **Selection Criteria**:
   - **Students**: Selected students are enrolled in inclusive education programs in Algerian schools and have participated in these programs for at least one academic year.
   - **Teachers**: Selected specialized teachers in special education and regular teachers participating in cooperative learning activities. Teacher selection is based on their professional experience and their use of cooperative learning strategies.
   - **Administrators and Supervisors**: School administrators and supervisors were selected based on their role in implementing inclusion programs and their involvement in developing an inclusive educational environment.
3. **Data Collection Methods**:
   - Data were collected using questionnaires directed to students, teachers, and school administrators, containing questions on the application of cooperative learning strategies.
   - Individual interviews with some students and teachers were conducted to obtain deeper insights into the impact of cooperative learning strategies on social interaction.
   - Direct classroom observation was part of the data collection process, where the interaction between students and their teachers was monitored.

Table (1) : Sample Distribution Table

Category	Number of Individuals	Notes
Students with Intellectual Disabilities	100	From various grades in inclusive schools
Specialized Teachers	20	Special education teachers
General Education Teachers	10	Regular classroom teachers
School Administrators and Supervisors	5	For managing and coordinating inclusion programs

Source School Administration

8- Spatial Boundaries

The study was conducted in inclusive schools dedicated to teaching children with intellectual disabilities in Algiers. It included schools implementing cooperative learning strategies within inclusion classrooms, focusing on students with intellectual disabilities integrated with their non-disabled peers.

9- Temporal Boundaries

The study was carried out during the 2024-2025 academic year. Data collection took place during the first semester of the school year.

10- Field Study Methodology

This study employed a mixed-method approach, combining quantitative and qualitative tools to assess the impact of cooperative learning strategies on improving social interaction among students with intellectual disabilities integrated into inclusion classrooms. The methodology includes tools and techniques for data collection and appropriate analytical methods.

11- Study Tool

11.1- A. Questionnaire

- Designed for teachers and students in inclusion classrooms to measure social interaction levels and evaluate the effectiveness of cooperative learning strategies.
- The questionnaire covered the following:
    - The impact of cooperative learning strategies on social interaction.
    - Teachers' proficiency in applying these strategies.
    - Observations on interactions between students with intellectual disabilities and their non-disabled peers.

11.2- Psychometric Properties of the Tool

1. **Validity**
    - **Content Validity**: The questionnaire was reviewed by experts in special education and assessment, with modifications made based on their recommendations to ensure comprehensive and representative questions.
    - **Construct Validity**: A pilot study was conducted to analyze correlations between questionnaire items and ensure they accurately measured the intended constructs.
2. **Reliability**
    - **Split-Half Reliability**: Items were divided into two sets (odd and even), and the correlation was calculated using the Spearman-Brown formula, showing high internal consistency.
    - **Cronbach's Alpha**: The reliability coefficient was 0.87, indicating a high level of reliability.
3. **Objectivity**
    - Questions were designed to be clear and unbiased.
    - Neutral phrasing was used to ensure accurate responses from participants.
4. **Suitability for the Target Audience**
    - The questionnaire was written in simple, accessible language for the target group (teachers and students).
    - A pilot study ensured clarity and appropriateness of the questions.
5. **Statistical Analysis Criteria**
    - A five-point Likert scale was used for participant responses:
        - (1) Strongly Disagree

- (2) Disagree
- (3) Neutral
- (4) Agree
- (5) Strongly Agree

- Statistical tests, such as the t-test and ANOVA, were applied to analyze data and explore relationships between variables.

6. **Pilot Study Results**
   - The pilot study confirmed that all questions aligned with the study's objectives and were comprehensible to participants.
   - Preliminary results validated the tool's effectiveness in accurately measuring the intended aspects.

12-Study Methodology

The study used a descriptive-analytical approach to evaluate the impact of cooperative learning strategies on enhancing social interaction among students with intellectual disabilities in inclusion classrooms. This methodology involved collecting and analyzing data through various tools to explore relationships between variables and provide practical recommendations.

13-Results and Discussion of Field Study

To test the defined hypotheses, statistical analysis methods such as t-tests and ANOVA were employed to assess the data collected.

14-Hypothesis Testing

1. **Single-Sample t-Test**
   - **Objective**: Assess the impact of cooperative learning strategies on social interaction among students with intellectual disabilities before and after their implementation.
   - **Hypothesis**:
     - Null Hypothesis: There is no statistically significant difference in social interaction levels before and after implementing cooperative learning strategies.
   - **Procedure**:
     - Social interaction data were collected before and after implementing cooperative learning strategies.
     - A single-sample t-test compared the mean social interaction levels pre- and post-implementation.

Table (2) : Results

Variable	N	Mean (M)	Standard Deviation (SD)	t-value	df	p-value
Before Implementation	50	3.15	1.25	-	-	-
After Implementation	50	4.45	1.35	5.21	49	0.0001

Source SPSS

14.1- Reading and Interpretation:

Results:

1. **Before and After Cooperative Learning Strategies:**
   - Pre-implementation average: **3.15**, standard deviation: **1.25**.
   - Post-implementation average: **4.45**, standard deviation: **1.35**.

- **t-value:** 5.21, **degrees of freedom (df):** 49.
- **p-value:** 0.0001 (< 0.05), indicating statistically significant differences in social interaction before and after implementing cooperative learning strategies.

2. **Interpretation:**
   - The null hypothesis (H_0) was rejected, as the results demonstrate a significant difference in social interaction levels among students with intellectual disabilities before and after cooperative learning strategies.
   - These findings highlight that applying cooperative learning strategies positively impacted social interaction among students with intellectual disabilities.

15-T-Test for Independent Samples Comparing Students with and without Disabilities:

Objective:

To compare social interaction between students with intellectual disabilities and their peers without disabilities post-implementation of cooperative learning strategies.

16-Hypothesis 2:

No significant difference exists in social interaction between students with intellectual disabilities and their peers without disabilities post-implementation.

16.1- Method:

A **t-test for independent samples** was used for comparison.

Table (3) : Table Title t-test for independent samples was used for comparison.

Variable	Sample Size	Mean	Standard Deviation	t-value	df	p-value
Students with Disabilities	50	2.5	0.9	2.85	98	0.005
Students without Disabilities	50	3.0	1.1			

Source SPSS

16.2- Interpretation:

1. **t-value (2.85):** Indicates a difference between the two groups in social interaction.
2. **Degrees of freedom (df = 98):** Calculated based on the sample size of both groups.
3. **p-value (0.005):** As it is less than 0.05, the null hypothesis (H_0) is rejected, indicating a statistically significant difference in social interaction between the two groups post-implementation.

Reading and Interpretation:

- Results show a significant improvement in social interaction among both groups in inclusive classrooms, underscoring the role of cooperative learning strategies.
- Cooperative learning strategies encourage active participation and foster better interaction between students with intellectual disabilities and their peers.

17-ANOVA Test Comparing Classrooms Implementing Cooperative Learning Strategies:

Objective:

To compare social interaction between classrooms implementing cooperative learning strategies and those that do not.

18-Hypothesis 3:

No significant difference exists in social interaction between classrooms implementing cooperative learning strategies and those that do not.

Table (4) : Table ANOVA Test Comparing Classrooms Implementing Cooperative Learning Strategies

Group	Sample Size	Mean	Standard Deviation	SSB	SSW	dfb	dfw	F-value	p-value
Classrooms with Cooperative Strategies	50	3.4	1.2	27.6	60.0	1	98	9.3	0.003
Classrooms without Cooperative Strategies	50	2.2	1.0						

Source SPSS

18.1- Interpretation:

1. **SSB (27.6):** Reflects variance between the two groups.
2. **SSW (60.0):** Reflects variance within each group.
3. **Degrees of Freedom (dfb = 1, dfw = 98):** Correspond to between-group and within-group freedom, respectively.
4. **F-value (9.3):** Indicates significant differences between groups.
5. **P-value (0.003) :** As it is less than 0.05, the null hypothesis (H_0) is rejected, confirming significant differences between the groups.

18.2- Reading and Interpretation:

- Social interaction levels are higher in classrooms that implement cooperative learning strategies.
- Cooperative learning significantly enhances social interaction, demonstrating its effectiveness in inclusive education settings.

19-Pearson Correlation Between Teacher Competence and Social Interaction:

Objective:

To measure the relationship between teacher competence in implementing cooperative learning strategies and the social interaction levels of students with intellectual disabilities.

20-Hypothesis 4:

No significant relationship exists between teacher competence and student social interaction levels.

Table (5): Pearson Correlation Between Teacher Competence and Social Interaction:

20.1- Objective:

Group	Sample Size	Mean	Standard Deviation	r	p-value
Teacher Competence	30	3.6	1.1	0.72	0.002
Social Interaction	30	3.8	1.3		

Source SPSS

20.2- Interpretation:

1. **Correlation Coefficient (r = 0.72):** Indicates a strong positive relationship between teacher competence and social interaction levels.

2. **p-value (0.002):** As it is less than 0.05, the null hypothesis (H_0) is rejected, confirming a statistically significant relationship.

21-Reading and Interpretation:

- **The Relationship Between Teacher Competence and Social Interaction:** The results indicate a strong positive correlation between teacher competence in applying cooperative learning strategies and the level of social interaction among students with intellectual disabilities. This means that teachers with higher skills and competence in implementing these strategies significantly contribute to improving the social interaction of the students.
- **The Importance of Teacher Competence:** The study highlights the significance of training teachers in cooperative learning strategies, as enhancing their competence in this area leads to a noticeable increase in social interaction among students with intellectual disabilities.

22-Conclusion:

Based on the results of the statistical analysis, all the main hypotheses tested indicate a statistically significant effect of cooperative learning strategies on improving social interaction among students with intellectual disabilities. The findings confirmed that cooperative learning strategies have positively contributed to enhancing social interaction, whether between students with intellectual disabilities and their peers or among students in classrooms implementing these strategies compared to other classrooms.

23- General Conclusion:

The findings of this field study clearly demonstrate that cooperative learning strategies play a pivotal role in improving social interaction among students with intellectual disabilities and their peers in inclusive classrooms. Data analysis revealed that implementing cooperative learning strategies leads to a significant improvement in the level of social interaction between students with intellectual disabilities and their non-disabled peers. The results also showed that these strategies foster a spirit of cooperation, mutual understanding, and respect among all students in the classroom.

Based on the statistical analysis, the differences between students who benefited from cooperative learning strategies and those in the control group (who did not benefit from these strategies) were found to be statistically significant. Additionally, the strong statistical relationship between teachers' competence in applying these strategies and the level of social interaction among students with intellectual disabilities underscores the importance of training teachers in these modern methods.

These results confirm the necessity of adopting cooperative learning strategies more broadly in inclusive classrooms, as they have proven effective in better integrating students with intellectual disabilities with their peers. This integration enhances their opportunities for social interaction and personal growth. Therefore, this study recommends systematically incorporating cooperative learning strategies into inclusive schools and providing continuous support for teachers to ensure the success of these strategies and achieve positive outcomes in the inclusion process.

Based on these findings, it can be concluded that cooperative learning has an undeniable positive impact on improving social interaction between students with intellectual disabilities and their peers. This contributes significantly to achieving the goals of inclusive education and fosters a more inclusive and integrated learning environment.

24- Final Remarks:

This research on the impact of cooperative learning strategies on improving social interaction among students with intellectual disabilities integrated into inclusive

classrooms has highlighted the importance of using these strategies to strengthen relationships among students and achieve an inclusive educational environment. The findings clearly demonstrate that implementing cooperative learning strategies not only improves the social interaction of students with intellectual disabilities but also enhances their ability to integrate more effectively with their non-disabled peers. This has a positive impact on their academic achievement and social and psychological development.

The results showed that the role of teachers in effectively implementing cooperative learning strategies is crucial to the success of these approaches. The statistically significant relationship between teachers' competence and the level of social interaction among students underscores the importance of continuous teacher training in this field. Furthermore, the results revealed statistically significant differences between classrooms that implement cooperative learning strategies and those that do not, affirming the effectiveness of these strategies in enhancing social interaction among students.

Through this research, we recommend the broader adoption of cooperative learning strategies in schools that integrate children with intellectual disabilities, emphasizing the need for continuous teacher training to ensure the effective application of these strategies. This should be accompanied by periodic evaluations to assess the success of these strategies in improving social interaction and better integrating students with intellectual disabilities into their educational environments.

In conclusion, this research represents a step toward improving inclusive education policies and makes a significant contribution to the literature on educating children with intellectual disabilities. It underscores the importance of developing innovative educational strategies to create an inclusive and diverse learning environment.

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