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The Effect of Using Homogeneous Student Groups in Cooperative Learning on The Achievement of Basic School Students: A Case Study, Jordan

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Abstract

Background/purpose. This study aimed to investigate the impact of pedagogical variation on student academic achievement in science among basic school students in Jordan. Specifically, it compared the Traditional Method (TM) and the Homogenous Groups Method (HGM) to address the need for improved teaching strategies that cater to students' learning abilities and interests. The research sought to determine whether HGM enhances academic outcomes compared to TM.

Materials/methods. A quasi-experimental design was employed involving a sample of 69 students from Sahlouliya Basic School in the Directorate of Education for Ain Al-Basha, Jordan, during the first term of the 2023–2024 school year. The students were divided into two groups: a control group of 34 students taught using TM and an experimental group of 35 students taught using HGM. The experimental group was further divided into seven homogenous groups based on similar learning abilities and interests, studying the same topics and objectives as the control group. Academic achievement was measured using a multiple-choice test (MCQ).

Results. The findings revealed statistically significant differences in academic achievement between the experimental group (HGM) and the control group (TM). Students taught using the HGM achieved higher mean scores, demonstrating the method's effectiveness in enhancing academic performance.

Conclusion. The study concluded that the Homogenous Groups Method (HGM) is a more effective teaching strategy for science education in basic schools compared to the Traditional Method (TM). It recommended adopting homogeneous grouping in cooperative learning settings to improve student outcomes in science classes.

1. Introduction

1.1. Background

Attention to individual differences among students is a fundamental topic in modern teaching methods, emphasizing the need to explore effective strategies for improving student achievement (Alsalhi et al., 2021). A key strategy for addressing these differences is differentiation, an educational approach that considers the diverse abilities, inclinations, and prior experiences of students. Differentiation aims to enhance achievement by adapting instructional methods to meet the unique needs of each learner, fostering their development to an acceptable level of performance (Al-Shugairat, 2009).

Among the various teaching strategies, cooperative learning has emerged as one of the most successful methods in education, particularly for subjects requiring active discussion and communication between teachers and students. Cooperative learning involves structured group activities in which students collaborate to achieve shared objectives or complete tasks. This method not only facilitates meaningful dialogue but also ensures efficient use of time while promoting both academic and social development (Mendo-Lázaro et al., 2022). However, effective cooperative learning requires more than merely grouping students together; well-designed tasks and intentional distribution of students are essential to maximize learning outcomes.

One specific approach within cooperative learning is homogeneous grouping, which forms the focus of this study. Homogeneous grouping involves organizing students based on similar abilities or academic levels and has been the subject of much debate and investigation (Gillies, 2016). Advocates, such as Johnson (2016) and Vega & Hederich (2015), argue that this method supports differentiated instruction by tailoring teaching methods to students' abilities, enabling them to achieve academic success. According to Hong and Hong (2009), homogeneous grouping fosters greater engagement by allowing students to work at their own pace while collaborating with peers of similar capability. Additionally, achievement, defined as measurable performance outcomes in academic areas, plays a critical role in evaluating the effectiveness of such strategies. Achievement reflects not only students' mastery of knowledge but also their ability to demonstrate success in standardized assessments (Spinath, 2012; Al-Qaoud, 1992).

Homogeneous grouping also offers several distinct advantages over traditional heterogeneous grouping. In homogeneous settings, students have greater opportunities to fully engage with tasks without relying on gifted peers to lead the work. This arrangement allows hidden talents and strengths to emerge within each group, as noted by Faris (2009) and Wang (2013). Furthermore, teachers play a critical role in fostering collaboration by ensuring students sit in close proximity, enabling active participation and meaningful discussions (Gillies, 2016). Group interactions also provide students with opportunities to develop social skills, such as interpreting non-verbal cues and responding to social signals, enriching both their learning experience and interpersonal development.

1.2. Objective of the Study

The current study aims to shed light on the impact of teaching using homogeneous cooperative learning groups for basic school classes on student academic achievement in science.

1.3. Study Question

The study attempts to answer the following research question:

RQ1. Are there statistically significant differences in the academic achievement of basic school students in science attributed to differences in teaching method (homogeneous cooperative groups, traditional learning)?

1.4. Significance of Study

This research offers valuable insights into the effectiveness of homogeneous cooperative groups as a teaching method, providing a meaningful comparison with traditional approaches. The findings enrich the existing literature on innovative educational practices and serve as a stepping stone for future researchers interested in modern teaching methodologies. Furthermore, the implications of this study extend beyond the local context, offering significant value to universities and educational institutions worldwide and encouraging the adoption of evidence-based strategies in diverse educational settings.

2. Literature Review

Learning is a dynamic process characterized by changes or modifications in behavior resulting from practice. This subjective activity originates from the learner, often facilitated by the guidance of a teacher (Al-Khalailah & Al-Lababidi, 1990). It involves a progression of experiences that enhance the learner's capacity for better performance and future learning. These changes can occur at various levels, including attitudes, knowledge, and behavior. As the learning process unfolds, learners often perceive concepts, ideas, and their worldview differently (Ambrose et al., 2010).

Academic achievement serves as a critical outcome of educational practices and a reliable indicator of learning success. It reflects the effectiveness of teaching and education in higher education while contributing to overall student development (Zhu, 2016; Alqawasmi et al., 2024). Despite the importance of such achievements during formal education, Kell et al. (2013) emphasize that academic success remains vital beyond schooling.

Cooperative learning has been shown to not only enhance educational outcomes but also foster mutual respect and build relationships among students from diverse backgrounds (Attle & Baker, 2007; Slavin, 2004). Research highlights the effectiveness of diverse teams, where students develop positive interdependence through collaborative learning activities (Gillies, 2007). Typically, cooperative learning involves small groups of four, enabling students to alternate between pairing up for tasks and reuniting for group discussions (Lai & Wu, 2006). This method encourages students to assist one another in understanding academic subjects, leading to improved learning outcomes.

When implemented effectively, cooperative learning has been associated with higher academic achievement and the development of critical thinking skills (Slavin, 2013). It also promotes higher-order cognitive abilities and constructive peer interactions. Bond and Castagnera (2006) suggest that peer teaching plays a significant role in this process, as social support from classmates and instructors enhances the learning experience. A cooperative atmosphere is essential for an effective peer support system, enabling students to achieve academic objectives collectively and fostering stronger connections among peers (Roseth et al., 2008).

The benefits of cooperative learning extend beyond academic success. Teachers can enhance group communication by organizing students in close proximity, allowing them to hear discussions, see one another's expressions, and participate in debates. These opportunities enable students to develop social cues and nonverbal communication skills. Ashman and Gillies (2003) found that students trained in cooperative learning techniques displayed greater independence, respect, and altruism. Such students also provided more detailed explanations to support their peers' understanding, improving overall group dynamics.

Additional research supports the idea that preparing students for collaboration can enhance their constructive interactions. Studies by Blatchford et al. (2003) and Johnson & Johnson (2006) highlight that training in cooperative techniques helps students foster positive and supportive relationships, ultimately contributing to their academic and social development.

Likewise, (Webb, 2009) pointed out that the development of collaborative skills among students is essential to the quality of interactive work among students, and therefore it is necessary to provide an environment that allows them to practice their collaborative skills. (Johnson and Johnson, 2009) pointed out that social skills facilitate student interactions during cooperative learning as shown in Figure 1.

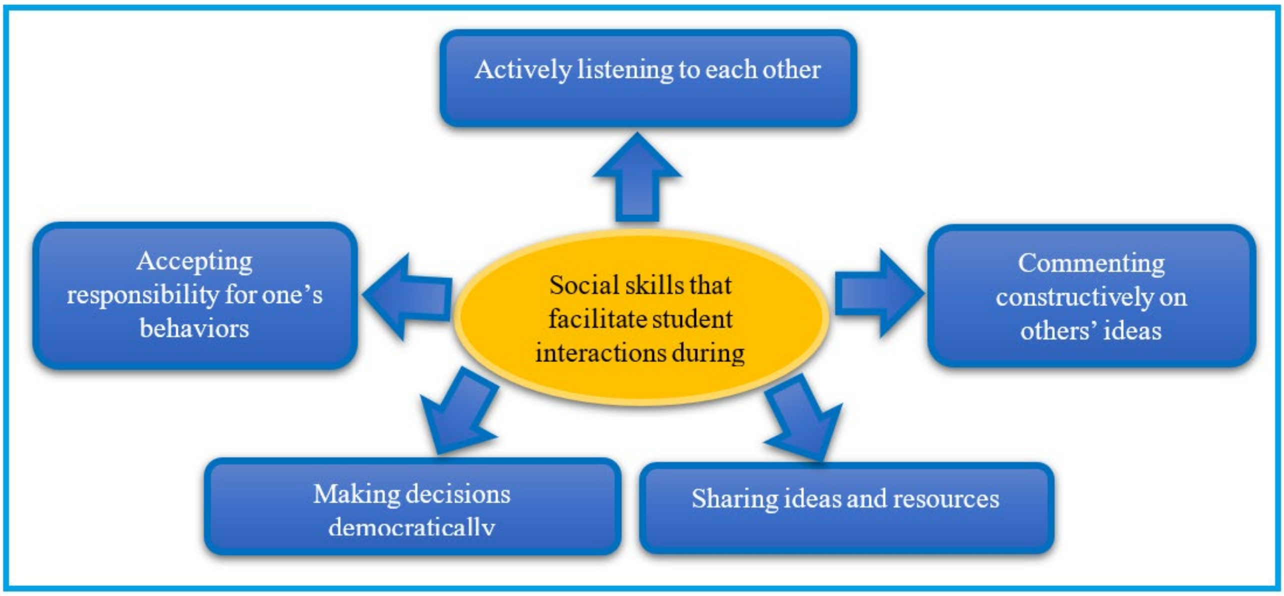

Figure 1. Social skills facilitate student interactions during cooperative learning

There are many benefits of using Cooperative learning, according to (Gillies, 2016; Abramczyk and Jurkowski, 2020; Li et al., 2022; Silva et al., 2022), as shown in Figure 2.

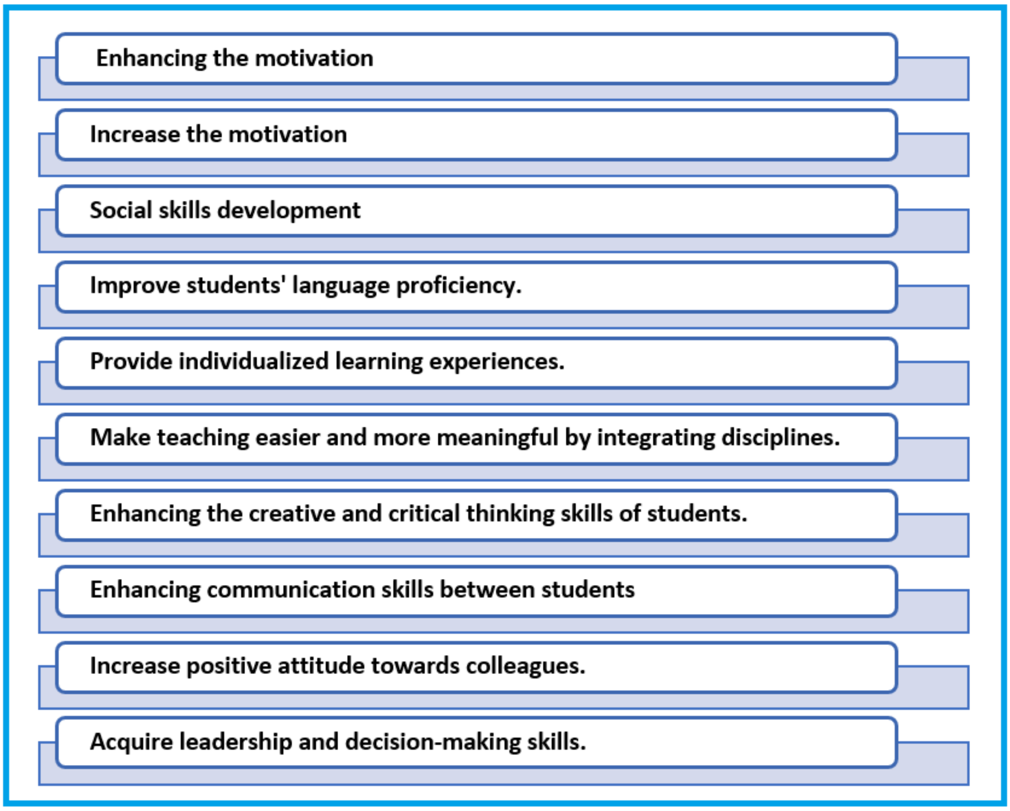

Figure 2. Benefits of using Cooperative Learning

On the other hand, cooperative learning has some drawbacks, such as Gillies (2016; Johnson & Johnson, 2009; Panitz, 1999; Slavin, 2011; Webb, 2009), as shown in Figure 3.

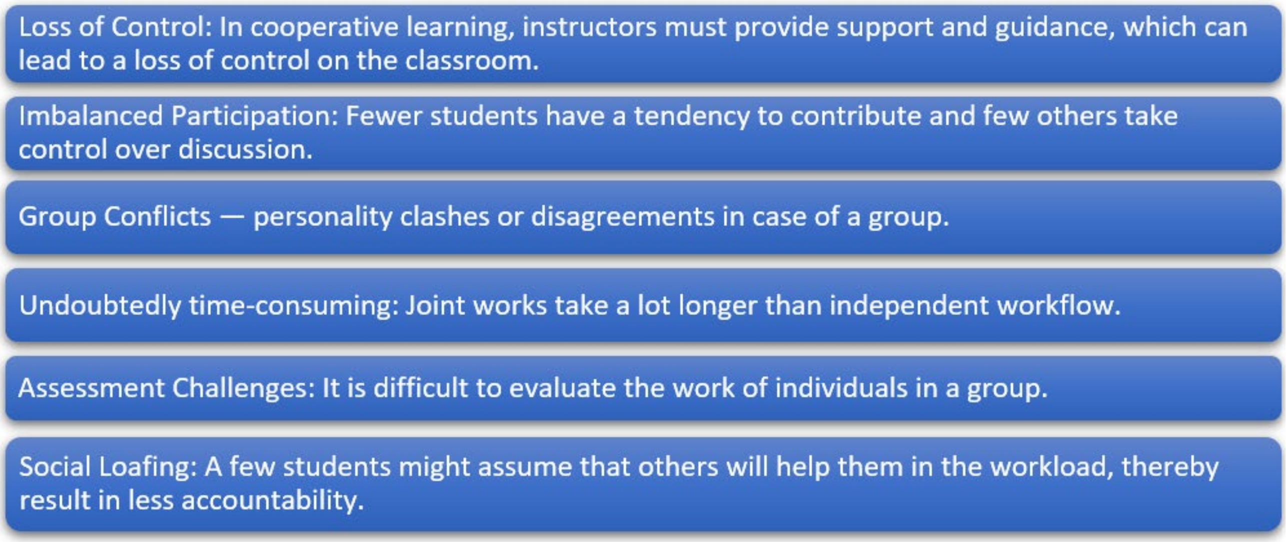

Figure 3. Drawbacks for Cooperative Learning

Homogeneous grouping refers to organizing students with similar abilities, interests, and skill levels within the same group, ensuring all members share comparable competencies (Ghanbari & Abdolrezapour, 2020). In contrast, heterogeneous groups consist of students with varying abilities and characteristics. Ramberg (2016) highlights the concept of ability grouping, where students are separated based on their academic abilities. Homogeneous grouping, particularly in subjects like mathematics, is often observed in middle or junior high school settings, especially at the eighth-grade level. According to the Second International Math Study (SIMS), ability grouping is more prevalent in some educational systems, where students are grouped based on broader measures of achievement and capability (Slavin, 1987a, 1987b).

Advocates of homogeneous grouping argue that it enables teachers to teach more effectively by tailoring lessons to students' specific needs. This approach can increase engagement and provide individualized support for both high- and low-achieving students (Boaler, 2013; Lou et al., 1996). Tieso (2003) further supports this perspective, suggesting that homogeneous grouping can lead to academic success for high-ability students when instruction is aligned with their capabilities.

Critics, however, raise concerns about the potential negative effects of homogeneous grouping. Oakes (2005) argues that this practice can reinforce disparities and stigmatize low-achieving students, often leading to inferior instruction and fewer resources. This, in turn, can impede their progress and harm their self-esteem. Additionally, Hallam and Ireson (2005) highlight that homogeneous grouping may reduce opportunities for peer learning and collaboration across different ability levels.

Moreover, research indicates that homogeneous grouping often reflects socioeconomic divisions. Burris and Garrity (2008) argue that while it may provide short-term benefits, this approach disproportionately affects working-class and African American students, perpetuating achievement gaps and locking in existing disparities. This raises the question: Is homogeneous grouping a fair and effective method in modern education, or does it exacerbate inequalities, as critics suggest?

Heterogeneous grouping involves combining students with varying ability levels, backgrounds, and learning styles within the same group. This approach encourages collaborative and peer learning, as students at different skill levels support each other’s growth and development (Ghanbari & Abdolrezapour, 2020). By working together, group members benefit from diverse perspectives and experiences, fostering an inclusive and dynamic learning environment.

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Research indicates that heterogeneous grouping promotes the development of higher-order thinking skills and facilitates more sophisticated interactions among students. It also helps mitigate achievement differences by allowing lower-achieving students to collaborate with peers who have attained higher skill levels, thereby raising overall group performance (Esposito & Slavin, 1998). Proponents of this approach argue that it is more inclusive and equitable, offering opportunities for all students to engage meaningfully in the learning process.

A study conducted in South Africa by Du Plooy (2019) explored the impact of homogeneous ability grouping on academic success and cultural structures within classrooms. Students were divided into two groups: "cheetahs" (above-average and average) and "giraffes" (below-average and at-risk). The findings revealed significant disparities, with cheetah group students having greater opportunities to achieve high scores and receive teacher attention, while giraffe group students often felt excluded, contributing to academic failure and behavioral issues as they sought recognition. Teachers also had lower expectations for the giraffe group, and students in this group reported being unable to advance to higher ability levels despite their aspirations.

In a separate study, Stapleton (2007) examined the effects of group composition on student performance. This research involved 417 students divided into 103 groups of four, including 55 homogeneous and 48 heterogeneous groups based on the Myers-Briggs Type Indicator (MBTI). The results showed that heterogeneous groups significantly outperformed homogeneous groups, leading Stapleton to recommend heterogeneous group compositions for better outcomes. Similarly, Chou and Luo (2003) investigated the effects of ability grouping on English learning motivation among 212 Taiwanese sixth-graders. Students in heterogeneous groups reported significantly higher motivation to learn English than those in homogeneous groups. However, some higher-achieving students in heterogeneous classes expressed a preference for homogeneous groups, believing such arrangements might better support their academic goals. The study also highlighted how lower-achieving students were perceived as less desirable by their peers, affecting group dynamics and individual motivation. Chou and Luo stressed the importance of grouping students based on educational objectives rather than rigid templates.

Further research has explored cooperative learning models compared to traditional instructional methods. For example, Miller and Polito (1999) investigated the impact of cooperative learning team competitions on 90 junior and senior-level agricultural education students. Teams were grouped by preferred learning modes (field-dependent, field-independent, field-neutral, and subject-mixed). While prior studies suggested heterogeneous groups outperform homogeneous ones, this study found no significant increase in satisfaction or participation among homogeneous teams. Similarly, Ramberg (2016) analyzed ability grouping in Swedish upper secondary schools, where 43% practiced ability grouping despite the lack of formal policy support. Teachers generally held positive views on the practice, though the study highlighted its limitations, including potential inclusivity issues.

The effectiveness of cooperative learning compared to traditional teaching methods has also been examined. Messier (2005) compared traditional lectures with cooperative learning techniques in Chinese schools and found that students in face-to-face lecture sections performed better on content knowledge tests than those in cooperative learning groups. In contrast, Ahmad and Mahmood (2010) found cooperative learning strategies more effective than traditional instruction in improving academic success. Chang and Mao (2010) tested the effects of cooperative learning on 770 ninth-grade students in earth science classes. While cooperative learning was more effective for application-level tasks, traditional methods showed better results for lower-level cognitive tasks.

Another study by Al-Shammari (2016) investigated the impact of cooperative learning on critical thinking and academic achievement among undergraduate students in Saudi Arabia. Dividing 62 participants into an experimental group using cooperative learning strategies and a control group receiving traditional instruction, the study revealed superior performance by the experimental group in academics and critical thinking. The findings emphasized the need to integrate cooperative learning strategies into higher education curricula and faculty development programs to enhance teamwork and student cooperation.

These studies reveal mixed findings regarding homogeneous versus heterogeneous grouping and the effectiveness of cooperative learning compared to traditional teaching. The evidence suggests a need for flexible approaches in grouping and instruction, tailored to individual student needs and educational goals. Teachers must be equipped with training grounded in empirical context to navigate the complexities of grouping strategies effectively, supporting diverse learning outcomes and disproving the adequacy of rigid ability-based homogenization (Cotič et al., 2023).

3. Methodology

3.1. Approach

The major research design for this study was a quasi-experimental, nonequivalent control-group approach. to examine the impact of pedagogical variation (TM: Traditional Method vs. HGM: Homogenous Groups Method) on student academic achievement in science. A pretest and posttest were done for academic achievement in science.

3.2. Study Participants

A convenience sample of 69 fifth-grade students was selected from Sahlouliya Basic School, which operates under the Directorate of Education for Ain Al-Basha, affiliated with the Jordanian Ministry of Education, Jordan, during the first term of the 2023–2024 school year. The students were divided into two groups: a control group and an experimental group. The control group, consisting of 34 students (49.3% of the total sample), was taught using the traditional method (TM). The experimental group, comprising 35 students (50.7% of the total sample), was instructed using the Homogenous Groups Method (HGM). In the HGM approach, students were divided into seven groups, each containing five students with similar learning abilities and interests. Both groups covered the same topics, standards, and learning objectives, but the instructional methods differed. Table (1) provides further details.

Table 1. Tallies, percentages & distributions of students per teaching method

Group	Frequency (f)	Percentage (%)
TM	34	49.3
HGM	35	50.7
Total	69	100

3.3. Study Variables

The current study includes the following variables

Independent variables: Teaching Method (TM, HGM)

Dependent variables: the students' academic achievement in science.

3.4. Study Tools/ Academic Achievement Test

The researchers designed an academic achievement test to assess the effect of the Homogenous Groups Method (HGM) on students' performance in the science course. The test was developed based on Bloom's cognitive domain classification (Hyder & Bhamani, 2016). A corresponding test specification table was also created (see Table 2). The final version of the test included 20 multiple-choice questions, with each correct answer earning one point and incorrect answers receiving zero points. The maximum possible score on the test was 20, and the duration of the exam was 80 minutes.

Table 2. Specification table for Academic achievement test per Bloom 's cognitive domain taxonomy

Topics	Remembering (20%)	Understanding (30%)	Application (50%)	%
Distance and Displacement	0.04	0.06	0.10	0.20
Speed and Velocity	0.08	0.12	0.20	0.40
Acceleration	0.08	0.12	0.20	0.40
Total	0.20	0.30	0.50	100%

Through Table. 3, knowledge level percentages were converted into marks, where "Distance and Displacement" 4 marks, "Speed and Velocity" 8 marks and "Acceleration " 8 marks, Meanwhile, the "Remembering" category 5 marks, Understanding 5 marks, and Application 10 marks. And the total Academic achievement test marked 20.

Table 3. Academic achievement test marks

Topics	Remembering (20%)	Understanding (30%)	Application (50%)	No. of Qs
Distance and Displacement	0.04×20=.8 ≈ 1	0.06×20=1.2 ≈ 1	0.10×20=2	4
Speed and Velocity	0.08×20=1.6 ≈ 2	0.12×20=2.4 ≈ 2	0.20×20=4	8
Acceleration	0.08×20=1.6 ≈ 2	0.12×20=2.4 ≈ 2	0.20×20=4	8
Total	5	5	10	20

3.5. Validity and Reliability

Academic achievement test the face and content validity was tested by showing it to 6 arbitrators who are specialized in science curricula, methods of teaching science, educational supervisors for science teaching and some experienced master teachers of sciences. They suggested deleting a few items and adding modifications to others. The test has construct validity, Scaling the items and resting the instrument to 28 students in a survey sample and so commencing to assure the parallel structure of the content and calculating Pearson correlation coefficient between each item and its dimension, scale & inter-scale respectively. The correlation coefficients varied from (0.82) at the highest level to (0.73) at the lowest levels, and also deleted all non-significant items The stability coefficient for the test was calculated by Cronbach alpha and the values of the stability coefficients: Stability Coefficient = 0.81 with a statistically significant rate at ($p < 0.01$) The test consists of 20 items in its final form and is classified as follows : Distance and Displacement 4 items, Speed and Velocity: 8 items, Acceleration:8items.

3.6. Equivalency of the Two Groups

The two groups are tied for scores and thus the mean and standard deviation of all student grades in these 2 groups are calculated as available on Table 4.

Table 4. The performance grade of the first group has an average and SD that is all higher than the second one in semester 1

Group	f	Mean (M)	Std. Deviation (SD)
First	34	78.53	7.86
Second	35	75.89	10.08

Table 4, reveals that the first and second groups stakeholders have different arithmetic means of the students' first semester grades. An independent samples t-test was employed to determine the significance of these differences. The collected findings are shown in Table 5.

Table 5. Independent Sample t-test to identify the source of differences in the first semester for the students in the first and second groups

Method	f	M	SD	t	df	sig
First	7.86	78.53	34	1.21	67	.229*
Second	10.08	75.89	35			

* Not statistically significant at a level of (0.05).

Table (5) shows that there were no statistically significant differences at a significance level of ($p \leq 0.05$) in the arithmetic means of the grades of the first semester for the students in the first and second groups. The arithmetic mean for the first group was (78.53) and the arithmetic mean for the second group was (75.89). The value of the t-statistic was (1.21), which is not statistically significant at a level of (0.05). This means that the first and second groups were equivalent in terms of their grades in the first semester before the study was conducted. Therefore, the first group was chosen to be the control group where the traditional method (TM) was implemented, and the second group was chosen to be the experimental group where the Homogenous Groups Method (HGM) was implemented.

4. Results

To address the research question, "Are there statistically significant differences in the academic achievement of basic school students in science due to the teaching method (Homogeneous Cooperative Groups vs. Traditional)?", an Independent Sample T-test was conducted. This test was used to determine whether significant differences existed between the control group (taught using the traditional method) and the experimental group (taught using the Homogeneous Groups Method). The mean scores and standard deviations of the post-test achievement results for both groups were calculated and are presented in Table 6.

Table 6. The mean scores and standard deviations of the achievement test scores for both groups TM and HGM

Method	f	Mean	Std. Deviation
TM	34	15.76	1.35
HGM	35	16.57	1.61

The scores of two groups control (TM) and experimental group (HGM) students on achievement test average is tabulated in table (6). The mean Score for the control group (TM) was 15.76 (SD =1.35), and for the experimental group (HGM) it was16.57(SD=1.61). Differences between the two groups

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were tested using an independent samples t-test to verify whether they are significant. Results obtained are shown in Table 7.

Table 7. Independent Sample t-test to identify the source of differences in the achievement test for the two groups of students, (TM) and (HGM)

Method	f	Mean	Std. Deviation	t	df	sig
TM	34	15.76	1.35	.311	67	.028
HGM	35	16.57	1.61			

With α=0.05, Table (7) depicts that the achievement test scores of the two groups are differing significantly as p≤ 0.05 Meanwhile, for HGM teaching method regarding calculating the mean score was (16.57), with a standard deviation (1.61). t-test statistic value = 3.11 (statistically significant at p <= 0.05) These results show that there is a significant difference in HGM over the TM group thus performance of HGM is better than the TM.

5. Discussion

The current study aimed to investigate the effect of two teaching methods (traditional method and homogenous grouping method of cooperative learning) on academic achievement of basic school students. The results showed that the homogenous grouping method of cooperative learning was superior to the traditional method with statistical significance. The learners who studied using the HGM showed better academic achievement than those who studied using the traditional method, including more collaboration among learners when they were in homogenous groups, which emphasizes the importance of peer teaching where learners are closer to each other and provide mutual assistance (Cotič et al., 2023). Although working in heterogeneous groups may help students respect their differences, especially between low- and high-achieving students and increase academic achievement, working in homogenous groups also yields positive results, as indicated by (Ahmad and Mahmood's, 2010) study, which showed that both types of cooperative learning, homogenous and heterogeneous, were better than the traditional method in improving academic achievement. and the results of the study agreed with (Miller and Polito, 1999), whose study found that in final course and teamwork, students in homogeneous groups, formed based on the field-neutral teams, attained the highest grades. However, it differed from a study by (Messier, 2005), which concluded that students who were taught using the lecture-based traditional method outperformed students who participated in cooperative learning groups of both types (homogeneous HOM and heterogeneous HET) during the semester. and the study (Stapleton, 2007), which investigated the effect of a heterogeneous and homogeneous grouping of students showed that the heterogeneous groups performed much better. So, Stapleton concluded a preference of heterogeneous grouping. On the other hand, some of studies (Chou and Luo, 2003; Ramberg, 2016) showed that teaching using homogeneous groups does not lead to better academic achievement. However, the current study showed that using HGM can improve students' academic achievement.

The results of the current study can be interpreted on the basis of the confidence that students gain in themselves and their feeling of reassurance, as explained by (Oakes, 2005), as the homogeneity between groups helps students to know themselves and benefit from their abilities within the group to which they belong (Gillies, 2007), and thus increases the effectiveness of education, especially for slow-learning students, who interact and are active in practicing educational activities (Al-Shammari, 2016). It can be confirmed that the effectiveness of teaching using the homogeneous group method of cooperative learning (HGM) increases when the teacher prepares an educational environment suitable for the growth of learners, increases their motivation to work in groups (Gillies, 2007), and helps them discover their tendencies and cognitive abilities (Al-Shammari, 2016), so students respect each other and their aggressive spirit decreases, as although sometimes improving achievement in heterogeneous groups is better, according to (Ramberg, 2016; Chou & Luo, 2003) students soon move to homogeneous groups, where slow-learning students have the opportunity to interact and participate with other students, and thus students can learn from each other in order to improve their achievement.

Overall, although (Johnson, 1985) confirmed that cooperative learning increases achievement, (Attle & Baker, 2007) found that this method enhances friendships among students, and (Slavin, 2013) noted that it develops students’ thinking skills, and many benefits of cooperative education of both types, the use of the homogeneous method has proven to be the best for students’ social and cognitive needs, as students choose to join homogeneous groups, preferring them over heterogeneous groups (Ramberg, 2016; Chou & Luo, 2003), and this supports the results of the current study.

6. Conclusion

The findings of this study highlight the effectiveness of the Homogenous Groups Method (HGM) as a pedagogical strategy for improving academic achievement in science among basic school students. Students taught using HGM outperformed their peers taught through the Traditional Method (TM), demonstrating that cooperative learning in homogeneous groups fosters better academic outcomes. The study underscores that grouping students based on similar abilities and interests enhances collaboration, mutual assistance, and confidence, particularly benefiting slow-learning students who actively participate in educational activities.

Despite some contrasting findings in previous studies about the comparative effectiveness of homogeneous and heterogeneous grouping, this study validates that homogeneous grouping can create a positive and supportive educational environment when accompanied by well-prepared lesson plans and motivated group settings. Such an approach not only improves cognitive outcomes but also nurtures social cohesion and reduces aggression among students.

The study also brings attention to broader implications, such as the need for adaptive instructional strategies to maximize the benefits of homogeneous grouping, while ensuring equity and inclusion for all students. However, its findings should be interpreted cautiously due to limitations, including its focus on a specific school and educational context in Jordan. Further research in diverse settings and over longer periods is recommended to establish the broader applicability of these results. Overall, the study reinforces the potential of homogeneous cooperative learning as a valuable tool for enhancing student achievement and supporting varied learner needs in science education.

7. Suggestion

Based on the study's results, it is recommended to incorporate homogeneous grouping into cooperative learning strategies when teaching science classes in basic schools, as it has proven to enhance academic achievement. Additionally, there is a need to focus on developing educators' teaching proficiency in implementing homogeneous grouping effectively, enabling them to adapt their instructional methods to optimize learning outcomes. Furthermore, future research is essential to help teachers identify the most suitable conditions and practices for successfully using homogeneous groups in teaching science, ensuring that this approach is applied effectively across diverse educational settings.

Declarations

Author Contributions. (N. Alsalhi.: Literature review, conceptualization. A. Alqawasmi: methodology, data analysis. N. Alsalhi.: review-editing and writing, M. Habboush: original manuscript preparation, S. Al-yateem. All authors have read and approved the published article's final version).
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Ethical Approval. (Ethical permission was received from Jordan's Ministry of Education under Reference Number [MOE/2024/1234], guaranteeing conformity with all applicable ethical norms, including informed consent, confidentiality, and voluntary involvement of study participants.).
Data Availability Statement. (The data that support the findings of this study are available from the corresponding author upon request.)
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