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Algebra Walk as Classroom Activity: Effects on the Achievement and Motivation Levels of Grade 8 Learners in Algebra

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ABSTRACT

This quantitative study examined the effects of the Algebra Walk as a classroom activity on the achievement and motivation levels of Grade 8 learners in graphing linear equations. Two groups participated: an experimental group exposed to the Algebra Walk and a control group taught using traditional paper-and-pencil activities. A researcher-made, validated achievement test and a motivation questionnaire were administered before and after the intervention. Data were analyzed using descriptive statistics, paired samples t-test, independent samples t-test, ANCOVA, and thematic analysis for qualitative responses. Results revealed that while both groups improved significantly, the experimental group demonstrated higher posttest scores (M = 28.18, SD = 5.35) and gain scores (M = 14.25, SD = 5.72) compared with the control group (M = 22.46, SD = 5.42; gain score M = 8.61). Motivation findings showed higher ratings in intrinsic motivation, self-regulation, utility value, and test anxiety for the experimental group. ANCOVA confirmed a significant effect of the intervention on achievement after controlling for pretest scores. These results indicate that the Algebra Walk is an effective strategy in enhancing both achievement and motivation in algebra.

Key Words: Achievement level, Algebra Walk, Classroom Activity, Motivation level, Grade 9 Mathematics.

1. INTRODUCTION

Algebra is a core component of secondary mathematics and is essential for success in advanced mathematics and STEM-related pathways (Hott et al., 2018). However, many learners struggle with foundational algebraic concepts, including variables, symbolic manipulation, and the connection between equations and their graphical representations (Jupri & Drijvers, 2016; Pramesti & Retnawati, 2019). Graphing linear equations is particularly challenging, as students often rely on procedures without fully understanding relationships between slope, intercepts, and coordinate points (Umah & Rahmawati, 2024; Sugiarti & Retnawati, 2019). In response to these persistent difficulties, researchers have emphasized the importance of active, student-centered, and embodied learning strategies. Movement-based activities such as math trails and physically enacted representations provide opportunities for learners to engage with mathematical ideas using multiple senses, aiding conceptual understanding and motivation (Barbosa et al., 2022; Way et al., 2024). These approaches also align with current STEM pedagogies that highlight exploration, collaboration, and real-world experiences (Vale, 2023).

One such innovation is the Algebra Walk, also known as human graphing, in which students physically walk along axes, slopes, and lines to model linear functions. This activity offers kinesthetic and visual experiences that help students make sense of graphing concepts that are often abstract and difficult to visualize (Parrish, 2015; Novak, 2017). Research on kinesthetic and multimodal mathematics instruction suggests that such activities can improve engagement, reduce anxiety, and support deeper understanding (Laswadi et al., 2022; Utami et al., 2021).

Despite these promising benefits, there remains limited empirical evidence on the effectiveness of movement-based algebra activities specifically for improving both achievement and motivation. This study therefore investigates the impact of the Algebra Walk on Grade 8 learners' performance and motivation in graphing linear equations. By incorporating movement, collaboration, and exploration, the study seeks to provide a more accessible and engaging approach to learning algebra.

1.1 OBJECTIVES

The purpose of this study is to determine the effects of Algebra Walk as a classroom activity on the achievement and motivation levels of Grade 8 learners. This study aims to:

1. Determine the achievement level of the Grade 8 learners in graphing linear equations.
2. Determine the motivation level of the Grade 8 learners in graphing linear equations.
3. Compare the mean scores in the achievement level of the learners between the control group and the experimental group.
4. Compare the mean scores in the motivational level of the learners between the control group and the experimental group.
5. Determine the means of the gain scores of the control group and the experimental group
6. Compare the mean gain scores in the achievement level of the learners between the control group and the experimental group.

2. METHODOLOGY

2.1 Research Design

This study, the researcher will use quantitative research design to determine the effects of Algebra Walk as classroom activity on Grade 8 learners' achievement and motivation levels in Algebra. The quantitative data are obtained through the achievement and motivation test.

2.2 Research Setting

This study was conducted at Integrated Developmental School (commonly referred to as IDS), is the high school department of MSU-Iligan Institute of Technology (MSU-IIT) in Iligan City, Philippines. The study lasted for two weeks, consisting of 6 one-hour sessions spread across 10 days. This condensed timeframe aims to achieve maximum efficiency while still thoroughly addressing the research objectives within the allocated time. Below is a map showing the location of the school.

2.3 Research Participants

The participants of the study are the Grade 8 learners in MSU-IIT Integrated Developmental School. The researcher utilizes a criterion sampling method to identify participants for the study. This involves selecting individuals based on specific criteria or relevant characteristics pertinent to the research, maintaining a professional approach to participant selection. To minimize the potential for bias or confounding variables in experiments, researchers employ a random assignment method known as the lottery technique to allocate classes to both the control and experimental group.

2.4 Research Instruments

2.4.1 Achievement Test

To determine if there is a significant difference in their achievement level, there will be a pre-test and post-test to measure the learners' mathematical proficiency before and after Algebra Walk. The researcher-made achievement tests are validated. The topics that are covered consist of the following learning competencies: (1) represents a linear equation using: (a) slope; (b) graph; and (c) equation. To validate and establish reliability, this instrument undergoes series of procedures before using data gathering. The first step was the developmental stage which compromises the construction of test items for Achievement test using a table of specification. For pilot testing, a dry run was conducted among Grade 8 learners of MSU-IIT Integrated Developmental School in Tibanga, Iligan City. Then, it was subjected to Item Analysis. After the validation, it was used as the pretest.

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2.4.2 Motivation Questionnaire

The researcher adapted the motivation questionnaire which was developed by Fiorella et al., (2021) to assess learners' motivation toward Algebra in both the control and experimental groups. It is modified accordingly for it to be suited to the study. This questionnaire contains several statements aimed at investigating the level of learners' motivation towards Algebra. This is a Likert-scale question that is indicated into five latent factors: intrinsic value, self-regulation, self-efficacy, utility value, and test anxiety. Intrinsic Value pertains to the student's feeling that learning algebra is personally valuable. Self-regulation refers to a student's tendency to engage in behavioral learning strategies. Self-efficacy is a student's belief that they have the necessary competence and capability to perform well in algebra. Utility value is a student's perception that algebra is personally relevant to their lives or future careers. Lastly, test anxiety refers to a student's feeling of anxiety toward being assessed in algebra or compared with others. All items were on a five-point Likert-type instrument where students assessed their level of agreement in every statement. This instrument was used to determine the impact of Algebra Walk intervention on students' motivation to learn algebra. A dry run was conducted to identify the internal consistency of the motivation questionnaire which was held at Mindanao State University (IDS).

2.4.3 Perception Questionnaire and Interview

The perception questionnaire was made by the researcher that consists of open-ended questions relevant to the study. The perception questionnaire was disseminated together with their post-test. The interview was conducted face-to-face after the post-test. The perception questionnaire and interview serve as a reference for assessing the learners' experiences with Algebra Walk and to get their insights after the enrichment activity: Algebra Walk. These guide questions were evaluated by a panel of evaluators.

2.5 Data Gathering Procedure

2.5.1 Asking for Permission

To guarantee the credibility of the research process before collecting data, a formal letter addressed to the School Principal of MSU-IIT Integrated Developmental School was presented. Assent and Consent letters addressed to the parents of the learners were also given. Upon the approval of the school, a section from the Grade 8 level was selected as the participants of the study. The learners are grouped accordingly to form the desired groups.

2.5.2 Orientation

The researcher introduced herself and explained the purpose of this research. All participants are asked to join the orientation to be held at the school, bringing with them the consent letter signed by their parents or guardian. The concept of the Algebra Walk was introduced only to the experimental group to make the learners aware of what the activity is all about, thus preparing them for the actual activity. Prior to the conduct of the orientation and/or the study, certain protocols are observed including protective measures and necessary documents for the school and other stakeholders.

2.5.3 Conducting of Pretest

The researcher used paper and pen to administer the pretest. The developed and validated achievement test was used as a pretest. After the pretest, it was examined for it is critical to determine if the two groups were statistically equivalent in their achievement levels prior to the implementation of the intervention. The approximately equal pretest mean scores must obtain for both groups before the intervention of the study to eliminate the possibility of having one group consisting of to say, mostly above-average achieving learners, which could be biased to the results.

2.5.4 Intervention

It centers around the actual implementation of the study. During this phase of the study, the researcher executed the study over the course of two weeks. This phase involves dividing the participants into two sections: the experimental group and the control group. In the experimental group, students were engaged in the activity known as Algebra Walk, where they actively explore linear equations in a hands-on manner. Meanwhile, the control group

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participated in a traditional paper-and-pen activity focused on linear equations as an alternative. Throughout the week, the researcher closely monitored both groups, ensuring that the activities are conducted as planned and that any necessary support is provided. At the end of the implementation phase, data regarding the achievement and motivation levels of the Grade 8 learners in algebra were collected and analyzed to assess the effectiveness of the Algebra Walk activity compared to the traditional method.

2.5.5 Conducting Posttest

Upon completion of the lessons, the achievement test and the motivation questionnaire which was developed and validated by Fiorella et al., (2021) were given to both the experimental and control group. Post-tests or assessments are administered to measure participants' achievement levels after the completion of the Algebra Walk intervention. This provides data for assessing the impact of the intervention on achievement.

2.6 Data Analysis

Quantitative analysis began with descriptive statistics to summarize the current mathematical proficiency levels among Grade 8 students, encompassing means and standard deviations. A paired sample t-test was utilized to determine if a statistically significant difference exists in the mean scores between the pretest and posttest, providing insights into the effectiveness of the Algebra Walk intervention in enhancing achievement levels. The tables below will be used for the interpretation of data. These serve as a basis to classify and determine the description of the intervals they belong to.

Table 1. Achievement Level Classification

Score Range	Interpretation
32-35	Outstanding
28-31	Very Satisfactory
24-27	Satisfactory
18-23	Fairly Satisfactory
0-17	Needs Improvement

Note: From https://www.ciit.edu.ph/k-to-12-grading-system/

The table indicates the achievement test score ranges and achievement level interpretation. This is based on the K-12 curriculum grading system approved by the Department of Education. The score ranges are set based on the number of items on the achievement test given with the lowest interval 0-17 classified as 'Needs Improvement' and the highest interval of 32-35 classified as 'Outstanding'. This table is used to determine the classification of the learners 'achievement level from the result on their achievement test scores.

Table 2. Score and Interpretation of the Different Levels of Motivation

Score	Interpretation
4.51 – 5.0	Very Highly Motivated
3.51 – 4.50	Highly Motivated
2.51 – 3.50	Moderately Motivated
1.51 – 2.50	Lowly Motivated
1.00 – 1.50	Very Lowly Motivated

Note: Adapted from the study "Online Learning and Students' Mathematics Motivation, Self-Efficacy, and Anxiety in the "New Normal" by L. Mamolo, 2022. From https://doi.org/10.1155/2022/949634

Table 2 shows the score and interpretation of the different levels of motivation from the study of Mamolo

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(2021). The researcher will modify suited for the present study. This was used to determine the classification of the learner's motivation level based on their responses to the motivation questionnaire.

Table 3. Category of normalized gain score

Score	Interpretation
14 and below	Ineffective
15 – 19	Less Effective
20 – 26	Effective Enough
27 – 35	Effective

Note: Adopted from the study "Implementation of sparkol videoscribe physics-based learning media pace to improve students' analytical skills" by Pratiwi, U., Setyaningrum, R. A., & Kurniawan, E. S. (2020)

Table 3 indicates the category of normalized gain scores from the study of Pratiwi, U., et. al (2020). This table shows the score and the interpretation of gain score from the achievement test scores. "The score range is determined by calculating the mean gain scores between the pretest and post-test. Scores falling within the lowest interval, indicating minimal improvement or a decrease, are classified as 'Ineffective.' On the other hand, scores within the highest interval, signifying substantial improvement, are categorized as 'Effective.' The scale is designed to assess the degree of progress individuals have made between the initial and final assessments, providing insight into the effectiveness of the intervention.

2.7 Statistical Tools

2.7.1 ANCOVA (Analysis of Covariance)

ANCOVA was used to compare the post-achievement scores of the experimental and control groups while statistically controlling for their pretest scores. This analysis allowed the researcher to determine whether the Algebra Walk had a significant effect on learners' achievement independent of their initial performance. By adjusting the posttest means based on pretest values, ANCOVA provided a more accurate comparison of the two groups and helped establish whether the intervention produced a meaningful improvement beyond what could be attributed to pre-existing differences.

2.7.2 Levene's Test for Equality of Variances

Levene's Test was employed to determine whether the assumption of homogeneity of variances was met for the t-tests and ANCOVA. This test assessed whether the variability of scores between the experimental and control groups was statistically similar. Meeting this assumption is important to ensure the validity and reliability of the inferential statistical analyses used in the study. By confirming that group variances were not significantly different, Levene's Test supported the appropriate use of the t-test and ANCOVA in comparing achievement and motivation outcomes.

2.7.3 Mean and Standard Deviation

Descriptive statistics, including the mean and standard deviation, were utilized to summarize and describe the learners' levels of achievement and motivation. These measures provided a clear overview of the students' performance before and after the intervention, as well as the variability of their scores within each group. By presenting the data in a simple and interpretable manner, descriptive statistics supported the identification of patterns, trends, and initial differences between the experimental and control groups prior to conducting inferential analyses.

2.7.4 Paired T-test

The Paired t-test was used to analyze the difference in scores within each group, allowing the researcher to determine if there is a significant change in achievement and motivation levels from before to after the intervention in both the experimental and control groups. This statistical analysis helps to evaluate the effectiveness of the Algebra Walk activity compared to the traditional paper-and-pen activity in improving the participants' achievement and

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motivation levels in algebra, specifically focusing on linear equations.

2.8 Coding of Data

The data gathered during the implementation of the study was coded accordingly. Since the study is comprised with two groups namely, experimental group and control group, it was coded as EG and CG respectively. Following the coding of each group, "EG1" was used to represent 'Experimental Group learner 1', and "CG1" for 'Control Group learner 1'.

3. RESULTS AND DISCUSSION

OBJECTIVE 1. Determine the achievement level of the Grade 8 learners in graphing linear equations.

Table 4. Achievement Level of the Grade 8 Learners in Graphing Linear Equations

Group	Pretest Score	Achievement Level	Posttest Score	Achievement Level
Experimental (n=28)	13.93±2.87	Needs Improvement	28.18±5.35	Very Satisfactory
Control (n=28)	13.86±2.43	Needs Improvement	22.46±5.42	Fairly Satisfactory

Table 4 presents the achievement levels of Grade 8 learners in graphing linear equations based on their pretest and posttest scores for both the experimental and control groups. At the start of the study, both groups performed similarly, with mean pretest scores of 13.93 (SD = 2.87) for the experimental group and 13.86 (SD = 2.43) for the control group. These scores fall under the "Needs Improvement" category, indicating that learners initially had limited understanding of graphing linear equations and required further instructional support.

After the intervention, notable differences emerged in the achievement levels of the two groups. The experimental group showed a substantial increase in their performance, achieving a mean posttest score of 28.18 (SD = 5.35), which corresponds to a "Very Satisfactory" level. This significant improvement suggests that the instructional strategy used in the experimental group was highly effective in enhancing learners' understanding and skills. In contrast, the control group also improved, with a posttest mean of 22.46 (SD = 5.42), categorized as "Fairly Satisfactory." While this indicates progress under traditional instruction, the improvement was not as strong as that of the experimental group.

OBJECTIVE 2. Determine the motivation level of the Grade 8 learners in graphing linear equations.

Table 5. Motivation Level of the Grade 8 Learners in Graphing Linear Equations

Motivation Parameters	Experimental (n=28)	Description	Control (n=28)	Description
Intrinsic	3.62±0.91	Highly Motivated	3.36±0.71	Moderately Motivated
Self-Regulation	3.99±0.66	Highly Motivated	3.63±0.59	Highly Motivated
Self-Efficacy	3.13±1.04	Moderately Motivated	3.01±0.79	Moderately Motivated
Utility Value	3.77±0.84	Highly Motivated	3.54±0.80	Highly Motivated
Test Anxiety	3.79±0.89	Highly Motivated	3.39±0.88	Moderately Motivated

Table 5 presents the motivation levels of Grade 8 learners in graphing linear equations across different motivation parameters for both the experimental and control groups. Overall, the experimental group demonstrated higher motivation levels in most areas. They showed high motivation in intrinsic motivation (M = 3.62), self-regulation (M = 3.99), utility value (M = 3.77), and test anxiety (M = 3.79), with only self-efficacy falling under the moderately motivated category (M = 3.13). In comparison, the control group reported moderate motivation in intrinsic motivation (M = 3.36), self-efficacy (M = 3.01), and

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test anxiety (M = 3.39), while self-regulation (M = 3.63) and utility value (M = 3.54) were rated as highly motivated.

These results suggest that the experimental condition had a positive influence on students' motivation, particularly in enhancing their intrinsic drive, perceived usefulness of the task, and ability to regulate their learning behaviors. The higher test anxiety score in the experimental group may reflect increased engagement or concern about performance, potentially tied to heightened motivation.

OBJECTIVE 3. Compare the mean scores in the achievement level of the learners between the control group and the experimental group.

Table 6. Test of Significant Difference in the Pre-Achievement Mean Scores of the Learners between the Control Group and Experimental Groups

Group	Mean	SD	t-value	df	P-value
Experimental (n=28)	13.93	2.87			
Control (n=28)	13.86	2.43	0.101^{ns}	54	0.920

Table 6 presents the comparison of pre-achievement mean scores between the experimental and control groups. The experimental group obtained a mean score of 13.93 (SD = 2.87), while the control group had a mean score of 13.86 (SD = 2.43). The independent samples t-test revealed no significant difference between the two groups (t = 0.101, p = 0.920), indicating that both groups started at a comparable level of achievement before the intervention. Furthermore, Levene's Test for Equality of Variances (F = 1.128, p = 0.293) confirmed that the assumption of equal variances was met, supporting the validity of the t-test analysis.

These results suggest that any differences observed in the post-achievement scores can be attributed more confidently to the intervention rather than to pre-existing differences in learners' abilities. The equivalence of the groups at baseline strengthens the internal validity of the study and ensures that the comparison between the experimental and control conditions is fair and meaningful.

Table 7. Test of Significant Paired Difference in the Pre- and Post-Achievement Mean Scores of the Learners in the Experimental Group

Paired Variable	Mean	SD	Mean diff. (SD)	t-value (df)	P-value
Pretest	13.93	2.87	-14.25 (5.72)	-13.184*** (27)	0.000
Posttest	28.18	5.35			

Table 4 presents the paired samples analysis comparing the pretest and posttest achievement scores of learners in the experimental group. The results show a substantial increase in performance following the intervention. The mean pretest score of 13.93 (SD = 2.87) rose sharply to a posttest mean of 28.18 (SD = 5.35). The computed mean difference of –14.25 (SD = 5.72) indicates a large improvement in achievement. This difference was statistically significant, as shown by the t-value of –13.184 with 27 degrees of freedom ($p < 0.001$).

These findings demonstrate that the instructional intervention used in the experimental group had a strong positive effect on learners' achievement in graphing linear equations. The significant improvement suggests that the approach was highly effective in enhancing students' understanding and performance. The magnitude of change reflects not only academic gains but also meaningful learning progression, showing that the experimental strategy fostered deeper comprehension and skill development among Grade 8 learners.

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Table 8. Test of Significant Paired Difference in the Pre- and Post-Achievement Mean Scores of the Learners in the Control Group

Paired Variable	Mean	SD	Mean diff. (SD)	t-value (df)	P-value
Pretest	13.86	2.43	-8.61 (6.17)	-7.386 (27)	0.000
Posttest	22.46	5.42			

*Note: ***significant at 0.001 level*

Table 8 presents the paired samples analysis of the pretest and posttest achievement scores of learners in the control group. The results show that while the control group also improved over time, the magnitude of their gain was smaller compared with the experimental group. The mean pretest score of 13.86 (SD = 2.43) increased to a posttest mean of 22.46 (SD = 5.42), resulting in a mean difference of –8.61 (SD = 6.17). This improvement was statistically significant, as indicated by the t-value of

–7.386 with 27 degrees of freedom (p < 0.001).

These findings indicate that traditional instruction still contributed to learners' progress in graphing linear equations, leading to meaningful learning gains. However, the smaller improvement compared with the experimental group suggests that while conventional teaching remains effective, it may not be as impactful as the instructional strategy used in the experimental condition. The results highlight the potential added value of innovative or enhanced teaching approaches in supporting greater academic growth among Grade 8 learners.

Table 9. ANCOVA Result of Testing the Differences of Post-Achievement Mean Scores between the Experimental and Control Groups when Controlling the Pretest Scores

Source	Sum of Squares	df	Mean Square	F-value	P-value
Pretest	0.870	1	0.870	0.029	0.864
Group	456.512	1	456.512	15.468***	0.000
Error	1564.201	53	29.513	--	--
Total	2021.583	55			

*Note: ***significant at 0.001 level Effect size for Group: 0.226 Levene's test of equality of error variances: F=0.016, p=.901*

Table 6 presents the ANCOVA results comparing the post-achievement mean scores of the experimental and control groups while controlling for their pretest scores. The analysis shows that the covariate, pretest score, was not a significant predictor of posttest performance (F = 0.029, p = 0.864), indicating that the initial achievement levels of the learners did not influence their final scores in a meaningful way. This supports the assumption that any observed differences in posttest achievement are not attributable to pre-existing differences between the groups.

The Group factor, however, was highly significant (F = 15.468, p < 0.001), demonstrating that the experimental and control groups differed substantially in their adjusted posttest scores. The effect size of 0.226 indicates a moderate but meaningful practical impact, suggesting that the instructional strategy used in the experimental group had a considerable positive effect on learners' achievement. Additionally, Levene's test (F = 0.016, p = 0.901) confirmed that the assumption of homogeneity of variances was satisfied, further validating the reliability of the ANCOVA results.

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Thus, these findings imply that the intervention implemented in the experimental group significantly enhanced learners' achievement in graphing linear equations, even after accounting for their initial performance.

OBJECTIVE 4. Compare the mean scores in the motivational level of the learners between the control group and the experimental group.

Table 10. Test of Significant Difference in the Mean Scores on the Motivational Level of the Learners between the Control Group and the Experimental Group

Motivation Parameters	Experimental Group (n=28)		Control Group (n=28)		t-value (df=54)	P-value
	Mean	SD	Mean	SD		
Intrinsic	3.62	0.91	3.36	0.71	1.198	0.236
Self-Regulation	3.99	0.66	3.63	0.59	2.139*	0.037
Self-Efficacy	3.13	1.04	3.01	0.79	0.505	0.616
Utility Value	3.77	0.84	3.54	0.80	1.057	0.295
Test Anxiety	3.79	0.89	3.39	0.88	1.664	0.102

*Note: *significant at 0.05 level*

Table 10 presents the comparison of the motivation levels between the experimental and control groups across five motivation parameters. The results indicate that the two groups did not differ significantly in most areas. For intrinsic motivation, self-efficacy, utility value, and test anxiety, no significant differences were found, as reflected by their respective p-values (all > 0.05). This suggests that both groups exhibited similar levels of internal drive, perceived usefulness of the learning task, confidence in their abilities, and anxiety toward mathematics-related assessments.

However, a significant difference emerged in self-regulation, where the experimental group (M = 3.99, SD = 0.66) scored higher than the control group (M = 3.63, SD = 0.59), with a t-value of 2.139 (p = 0.037). This indicates that learners exposed to the experimental instructional strategy demonstrated better self-management of their learning behaviors, such as setting goals, monitoring progress, and maintaining focus during tasks.

Hence, the findings suggest that while the experimental intervention did not substantially alter most motivational dimensions, it positively influenced learners' self-regulation skills. This improvement may be attributed to the structure or features of the instructional approach, which may have encouraged more active, independent, and organized learning. Enhanced self-regulation is an important outcome, as it is closely linked to academic success and long-term learning habits.

OBJECTIVE 5. Determine the means of the gain scores of the control group and the experimental group

Table 11. Gain Scores of the Learners in the Control Group and the Experimental Group

Group	Mean	SD
Experimental (n=28)	14.25	5.72
Control (n=28)	8.61	6.17

Table 11 presents the gain scores of learners in both the experimental and control groups, reflecting the amount of improvement from pretest to posttest. The results show that the experimental group achieved a substantially

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higher mean gain score (M = 14.25, SD = 5.72) compared with the control group (M = 8.61, SD = 6.17). This indicates that learners who received the experimental instructional approach demonstrated greater academic improvement than those taught using traditional methods.

OBJECTIVE 6. Compare the mean gain scores in the achievement level of the learners between the control group and the experimental group.

Table 12. Test of Significant Difference on the Mean Gain Scores of the Learners between the Control Group and the Experimental Group

Group	Mean	SD	t-value (df)	P-value
Experimental (n=28)	14.25	5.72		
Control (n=28)	8.61	6.17	3.550*** (54)	0.001

Table 9 presents the test of significant difference in the mean gain scores between the experimental and control groups. The results show that the experimental group achieved a considerably higher mean gain score (M = 14.25, SD = 5.72) compared with the control group (M = 8.61, SD = 6.17). The independent samples t-test revealed a statistically significant difference between the two groups (t = 3.550, p = 0.001), indicating that the improvement in achievement was significantly greater for learners who received the experimental instructional approach.

This finding reinforces the effectiveness of the intervention implemented in the experimental group. The significantly larger gain score suggests that the instructional strategy not only enhanced students' understanding but also facilitated deeper learning and better retention of concepts related to graphing linear equations. The results strongly support the conclusion that the experimental method provided added instructional value compared with traditional teaching approaches, leading to more substantial academic progress among Grade 8 learners.

4. CONCLUSIONS

The findings of the study demonstrate that the Algebra Walk is an effective instructional approach for improving Grade 8 learners' understanding of graphing linear equations. Learners who participated in the Algebra Walk showed significantly higher posttest scores, larger gain scores, and greater improvement compared with those taught through traditional methods. Although both groups began with similar levels of achievement, the experimental group achieved a "Very Satisfactory" level after the intervention, confirming the strong impact of the activity. In terms of motivation, the Algebra Walk enhanced several motivational dimensions, particularly self-regulation, and generally resulted in higher motivation scores than the control condition.

Overall, the results indicate that integrating movement-based, interactive activities such as the Algebra Walk can enhance both achievement and motivation in mathematics, making algebra more accessible, engaging, and meaningful for learners.

5. RECOMMENDATIONS

Based on the findings of the study, it is recommended that the Algebra Walk be integrated regularly into classroom instruction to enhance learners' understanding of graphing linear equations. Teachers are encouraged to incorporate more kinesthetic, visual, and interactive strategies to support diverse learning styles and sustain student engagement. Extending the duration of the intervention may further strengthen its impact on achievement and motivation. Future studies should also involve a larger sample size or additional sections to increase the generalizability of the findings. Lastly, continued use of interviews, reflections, and other qualitative measures is recommended to gain deeper insights into learners' experiences and the long-term effects of the Algebra Walk on their learning.

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