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Grade 7 Students' Statistical Skills Through Community Survey and Real-Life Data Interpretation Activities

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Abstract

This study examined changes in learners' abilities in data gathering, data presentation, data interpretation, tool usage, and conclusion-making before and after the implementation of community survey and real-life data interpretation activities. The research also investigates how this approach influences students' critical thinking, confidence, and engagement in performing statistical tasks. Fifty grade 7 students of Anselmo A. Sandoval Memorial National High School were the participants of the study.

The study employed a descriptive research method, using survey questionnaire to determine the description of the community survey and real-life data interpretation activities. Moreover, a pre-test and post-test assessment was given to determine the effectiveness of these activities.

The findings revealed that prior to the intervention, students possessed only moderate competence in statistical concepts, struggled with systematic data collection, and lacked confidence in interpreting and presenting results. Following the integration of community-based and real-life data activities, marked improvements were observed in accuracy, tool usage, analytical reasoning, and evidence-based conclusion-making. Students reported a stronger connection between classroom learning and real-life applications of statistics. However, challenges such as limited learning resources, unequal participation in group tasks, shyness in community interactions, and time constraints persisted.

To address these concerns, the study recommends providing adequate learning materials, conducting confidence-building and data management workshops, promoting structured peer collaboration, integrating time management strategies, and strengthening teachers' capacity in contextualized instruction. These steps aim to enhance students' statistical literacy, critical thinking, and overall engagement in mathematics.

Keywords: *Contextualized Learning, Student Engagement, Critical Thinking, Community-Based Learning partnership, learner engagement*

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Introduction

In today's fast-paced world the ability to interpret and analyze data has become an essential skill for students not only in academic settings but also in everyday life. Grade 7 students, in particular, often struggle to connect mathematical concepts such as statistics with real-life applications. Traditional classroom approaches frequently rely on abstract exercises that fail to engage students in meaningful ways leaving gaps in understanding and practical skills. These global trends highlight the need for teaching strategies that move beyond rote memorization toward meaningful engagement with numbers and information.

This study aimed to improve the statistical skills of Grade 7 students through the use of community survey and real-life data interpretation activities at Anselmo A. Sandoval Memorial National High School. Specifically, the study sought to answer the following questions:

1. How may the statistical skills of Grade 7 students be described before the implementation of community survey and real-life data interpretation activities in terms of:
   1.1 data gathering;
   1.2 data presentation; and
   1.3 data interpretation?
2. To what extent do community survey and real-life data interpretation activities improve the students' statistical skills in terms of:
   2.1 data accuracy;
   2.2 tool usage; and
   2.3 conclusion making?
3. How beneficial are community-based statistical activities in enhancing students' learning in relation to:
   3.1 real-life application; and
   3.2 critical thinking?
4. What challenges do students encounter in conducting community survey and interpreting real-life data?
5. Based on the findings of the study, what project-based statistical activities may be proposed?

Methodology

Research Design

This study employed a mixed-method approach using a pretest-posttest design combined with descriptive analysis. This allowed the researcher to measure students' improvement and gather their perceptions of the benefits, challenges, and applicability of statistical activities in real-life situations.

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Participants

The study involved 50 Grade 7 students of Anselmo A. Sandoval Memorial National High School. A purposive sampling technique was employed to select participants who were deemed appropriate for the study based on their exposure to statistics lessons and their participation in the implemented activities.

Research Instrument

A teacher-made test, a researcher-developed questionnaire and a performance rubric guide to gather the data required in this study. These instruments were carefully designed to evaluate the level of students' statistical skills, the effectiveness of community survey and real-life data interpretation activities, and the benefits and challenges students encountered in performing such tasks.

Data Collection Procedure

The researcher first secured formal approval from the school principal and conducted an orientation to inform the selected Grade 7 participants about the purpose and procedures of the research. Parental consent and student assent were obtained prior to data collection. A pre-test was administered to assess students' baseline statistical skills in data gathering, presentation, and interpretation. The implementation phase involved community survey and real-life data interpretation activities, where students collected, organized, and analyzed data, and presented their findings using tables, charts, and graphs. After the intervention, a post-test and a survey questionnaire were administered to measure improvement and assess perceived benefits in terms of real-life application and critical thinking. All collected data were then organized, tallied, and analyzed using appropriate statistical methods to ensure accuracy and validity of the results.

Data Analysis

The study utilized descriptive statistical tools, including **weighted mean** used to compute the average weighted responses for each indicator related to accuracy, tool usage, and conclusion making**, ranking** helped identify which aspects of the activities were considered the most and least beneficial by the students, and **composite mean**, used to determine the overall average of students' responses regarding their perceived improvement in statistical skills before and after the implementation of community survey and data interpretation activities.

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Results

Section 1: Statistical Skills of Grade 7 Students Before the Implementation of Community Survey and Real-Life Data Interpretation Activities

Students possessed a moderate level of competence. Students Pre-Implementation Skills showed **moderate competence** in data gathering (CM = 2.54), data presentation (CM = 2.57) data interpretation (CM = 2.57). The findings imply that students struggle with more advanced interpretation tasks, identifying trends, understanding data processes and collecting data from multiple sources.

Table 1. Statistical Skills in Data Gathering

Data Gathering	WM	VI
1. I can collect information from different sources effectively.	2.44	Disagree
2. I understand the steps involved in gathering statistical data.	2.20	Disagree
3. I can create simple survey questions for data collection.	2.56	Agree
4. I am able to record responses accurately during data gathering.	2.82	Agree
5. I find data gathering manageable and clear.	2.70	Agree
Composite Mean	**2.54**	**Disagree**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The findings imply that before the implementation of contextualized and real-life survey activities, students demonstrated partial understanding of statistical concepts and inconsistent application of data-gathering skills.

Table 2. Statistical Skills in Data Presentation

Data Presentation	WM	VI
1. I can collect information from different sources effectively.	2.36	Disagree
2. I understand the steps involved in gathering statistical data.	2.62	Agree
3. I can create simple survey questions for data collection.	2.66	Agree
4. I am able to record responses accurately during data gathering.	2.16	Disagree
5. I find data gathering manageable and clear.	3.04	Agree
Composite Mean	**2.57**	**Agree**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The results signify that while students demonstrate a fair understanding of how to organize and present data, there remains a need to strengthen their practical skills in accurate data handling and interpretation.

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Table 3. Statistical Skills in Data Interpretation

Data Interpretation	WM	VI
1. I can explain the meaning of data presented in tables.	2.62	Agree
2. I can draw simple conclusions from graphs and charts.	2.36	Disagree
3. I can identify trends and patterns in statistical data.	2.16	Disagree
4. I can connect data interpretation to real-life situations.	2.66	Agree
5. I find interpreting statistical results understandable.	3.04	Agree
Composite Mean	**2.57**	**Agree**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The findings imply that while students can understand and explain data at a basic level, they struggle with more advanced interpretation tasks.

Section 2: Extent of the Utilization of Community Survey and Real-Life Data Activities to Improve Student's Statistical Skills

Table 4. Level of Improvement in Statistical Skills After Implementation in Terms of Data Accuracy

Data Accuracy	WM	VI
1. I make fewer mistakes in computing data during activities.	3.08	Agree
2. I can verify if gathered data is correct and reliable.	3.30	Agree
3. I double-check my work to ensure accuracy in results.	3.55	Strongly Agree
4. I understand the importance of accurate data in conclusions.	3.22	Agree
5. I can spot and correct errors in data collection or computation.	3.20	Agree
Composite Mean	**3.27**	**Agree**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The computed composite mean of 3.27, verbally interpreted as "Agree," indicates that students exhibited a noticeable improvement in performing data-related tasks with greater precision and reliability.

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Table 5. Level of Improvement in Statistical Skills After Implementation in Terms of Data Accuracy

Tool Usage	WM	VI
1. I can use calculators correctly when dealing with data.	3.16	Agree
2. I am confident in using rulers, tally sheets, and similar tools.	3.36	Agree
3. I can use statistical tables effectively to organize results.	3.40	Agree
4. I can select the proper tool for presenting data.	3.38	Agree
5. I can use digital tools (e.g., Excel, graphing apps) for data presentation.	3.43	Agree
Composite Mean	**3.35**	**Agree**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The composite mean of 3.35, verbally interpreted as "Agree," indicates that students significantly improved their ability to select and use various statistical tools correctly and efficiently. The highest-rated statement, *"I can use digital tools (e.g., Excel, graphing apps) for data presentation"* (WM = 3.43), suggests that students became more confident in applying technology to organize and visualize data.

Table 6. Level of Improvement in Statistical Skills After Implementation in Terms of Conclusion Making

Conclusion Making	WM	VI
1. I can explain results based on gathered data.	3.45	Agree
2. I can make logical conclusions from survey results.	3.17	Agree
3. I can relate conclusions to real-life problems.	3.36	Agree
4. I can support my conclusions with accurate evidence.	3.07	Agree
5. I feel confident presenting conclusions to others.	3.33	Agree
Composite Mean	**3.28**	**Agree**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The computed composite mean of 3.28, verbally interpreted as "Agree," indicates that students showed notable improvement in drawing, supporting, and presenting logical conclusions derived from collected data.

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Section 3: Benefits of Community-Based Statistical Activities

Table 7. Benefits of Community-Based Statistical Activities in Terms of Real-Life Application

Statements	WM	VI
1. I see how statistics apply in daily life through community surveys.	3.50	Very Great Extent
2. I understand the value of data in solving real problems.	3.38	Great Extent
3. I can use what I learn in class when analyzing real-life data.	3.57	Very Great Extent
4. I apply statistical concepts in simple personal decisions.	3.34	Great Extent
5. I realize the importance of statistics in society.	3.48	Great Extent
Composite Mean	**3.45**	**Great Extent**

Legend: WM – Weighted Mean; VI – Verbal Interpretation

The composite mean of 3.45, interpreted as "Great Extent," reveals that students significantly recognize the importance of community-based statistical activities in connecting classroom learning to real-life situations.

Table 8. Benefits of Community-Based Statistical Activities in Terms of Critical Thinking

Statements	WM	VI
1. I think more deeply when interpreting survey results.	3.35	Great Extent
2. I can analyze situations before making conclusions.	3.45	Great Extent
3. I question data reliability before accepting results.	3.26	Great Extent
4. I evaluate different possibilities when interpreting graphs.	3.35	Great Extent
5. I use reasoning skills when solving statistical problems.	3.30	Great Extent
Composite Mean	**3.34**	**Great Extent**

The composite mean of 3.34, interpreted as "Great Extent," reveals that community-based statistical activities have effectively enhanced the students' critical thinking skills.

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Section 4: Challenges Met by the Students in Conducting Community Survey and Data Interpretation

Table 9. Challenges in Conducting Community Survey and Data Interpretation

Statements	WM	VI
1. I sometimes feel shy in asking questions during surveys.	3.52	Strongly Agree
2. I find it difficult to approach community members for data gathering.	3.40	Agree
3. I have trouble organizing large amounts of collected data.	3.38	Agree
4. I find graph-making time-consuming and challenging.	3.15	Agree
5. I still get confused when interpreting data.	3.33	Agree
6. I lack confidence in presenting survey results.	3.35	Agree
7. Limited resources (paper, tools, internet) affect my performance.	3.58	Strongly Agree
8. Some group members do not participate actively.	3.52	Strongly Agree
9. Time constraints affect data gathering and analysis.	3.22	Agree
10. I sometimes feel overwhelmed with real-life data interpretation tasks.	3.33	Agree
Composite Mean	**3.38**	**Agree**

The composite mean of 3.38, verbally interpreted as "Agree," indicates that students encounter moderate challenges in conducting community surveys and interpreting data.

Section 5: Proposed Intervention Activities to Address the Identified Challenges

The following intervention activities are proposed to address the challenges encountered by Grade 7 students during the implementation of community survey and real-life data interpretation activities. These interventions aim to strengthen statistical competence, improve engagement, and provide sustained support for contextualized learning.

1. Hands-On Data Gathering and Accuracy Workshop – Students collect real or simulated community data using calculators, rulers, graphing tools, and printed forms. They organize the data into tables and graphs using recycled materials or worksheets, and interpret results through guided discussion.

2. Spreadsheet Skills and Data Management Bootcamp – Students learn how to encode, sort, compute, and visualize data using spreadsheets (Excel or offline Google Sheets). They analyze their community dataset to create graphs and summary tables.

3. Role-Play Interviews and Presentation Clinic – Students engage in mock interviews, practice oral reporting, and present statistical findings to peers or invited community members. Teacher conducts feedback sessions to improve communication skills.

4. Collaborative Data Challenge with Rotating Roles – Students are assigned rotating roles (data gatherer, recorder, analyst, presenter) in group activities. Reflection tools and peer evaluation ensure accountability and teamwork.

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5. Project-Based Community Mini-Statistics Fair – Students work on a multi-week project involving community data collection, analysis, and presentation. Outputs are showcased during a school or community statistics fair.

Discussion

The findings revealed that the integration of community-based and real-life data interpretation activities significantly improved the statistical skills of Grade 7 students. From a moderate level of competence, learners showed progress in data accuracy, tool usage, and conclusion-making after the intervention. This suggests that engaging students in authentic, hands-on experiences enhances their understanding of statistical concepts and increases their confidence and engagement in learning.

The results also indicate that students developed higher-order thinking skills, particularly in analyzing data, verifying information, and drawing logical conclusions. Their ability to relate statistical concepts to real-life situations reflects deeper understanding and relevance. These findings support constructivist learning theory, which emphasizes that learning becomes more meaningful when students actively participate in real-world experiences.

Despite these improvements, several challenges were encountered, including limited resources, unequal participation in group work, and students' lack of confidence in interacting with the community. These issues highlight the need for proper guidance, adequate materials, and structured support. Overall, the study confirms that community-based statistical activities are effective in improving students' skills when properly implemented.

Conclusion

This study concludes that community survey and real-life data interpretation activities are effective in enhancing the statistical skills of Grade 7 students. Through these activities, students demonstrated improvement in data accuracy, analysis, and conclusion-making, while also developing stronger critical thinking skills and increased engagement in learning. Moreover, the use of real-life contexts allowed students to better appreciate the relevance of mathematics and apply statistical concepts in meaningful situations. Therefore, the integration of contextualized and experiential learning strategies is highly recommended in teaching statistics to promote deeper understanding and practical application among learners.

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