

PROJECT DATA-SPORT (Developing Analytical Thinking and Academic Skills through Sports Performance Observation, Reflection, and Tracking): Enhancing Literacy, Numeracy, and Life Skills Competencies through Fitness and Sports Data Integration in Senior High Schools

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ABSTRACT

Physical Education provides opportunities for integrating academic competencies such as analytical thinking, literacy, and numeracy through performance-based activities. However, many Physical Education programs focus primarily on physical participation without maximizing the use of sports performance data as a learning resource. This study examined the effectiveness of PROJECT DATA-SPORT (Developing Analytical Thinking and Academic Skills through Sports Performance Observation, Reflection, and Tracking) in enhancing literacy, numeracy, and life skills competencies among Senior High School students through sports and fitness data integration.

This study utilized a quantitative school-based action research design conducted among forty (40) Senior High School students during the School Year 2025–2026. The intervention involved structured observation, recording, analysis, and reflection of sports performance indicators such as time, distance, repetitions, and fitness scores. Data were collected using a researcher-made four-point Likert scale questionnaire, performance tracking sheets, and reflection logs. The collected data were analyzed using weighted mean and descriptive statistics.

Results revealed that the implementation of PROJECT DATA-SPORT significantly enhanced students' analytical thinking, numeracy, and life skills competencies. Students demonstrated a very high level of analytical thinking through sports data analysis (overall mean = 3.37), indicating their ability to interpret and evaluate

performance indicators. The project also improved students' numeracy skills in computing and organizing sports performance data (overall mean = 3.31). In addition, students developed stronger life skills such as self-discipline, goal setting, and self-monitoring (overall mean = 3.40). Engagement in sports data observation and reflection activities was also rated very high (overall mean = 3.38), suggesting that integrating performance tracking increased students' motivation and participation in Physical Education classes.

The findings conclude that integrating sports performance data in Physical Education significantly enhances students' analytical thinking, numeracy skills, and life skills development. PROJECT DATA-SPORT demonstrates that Physical Education can serve as an interdisciplinary platform for promoting academic competencies while improving physical fitness engagement. Schools are encouraged to institutionalize sports data integration strategies to support holistic learning and strengthen literacy and numeracy development in Senior High School students.

Keywords: sports data integration, analytical thinking, numeracy, literacy, physical education, performance tracking, senior high school

INTRODUCTION

Physical Education plays a crucial role in developing students' physical, cognitive, and social competencies. Beyond improving physical fitness, Physical Education provides opportunities for learners to develop analytical thinking, decision-making skills, and reflective learning through structured activities and performance evaluation. According to Bailey (2006), physical education contributes not only to physical development but also to cognitive and social learning outcomes.

In recent years, educational reforms have emphasized the importance of integrating interdisciplinary skills such as literacy, numeracy, and analytical thinking within different subject areas. The **K to 12 Basic Education Program under Republic Act No. 10533** highlights the need for learners to acquire twenty-first century competencies including critical thinking, problem solving, and data literacy.

Sports and fitness activities naturally generate measurable data such as distance, time, heart rate, repetition counts, and performance scores. These data provide meaningful opportunities for students to practice numeracy skills through measurement, calculation, and interpretation. According to McKenzie and Lounsbery (2013), performance monitoring and feedback in Physical Education enhance student learning and motivation.

Despite these opportunities, many Physical Education programs focus primarily on physical performance and participation without fully integrating academic competencies such as analytical thinking and data interpretation. This gap limits the potential of Physical Education as a platform for interdisciplinary learning.

To address this concern, **PROJECT DATA-SPORT** was developed as an innovative intervention that integrates sports performance observation, reflection, and tracking into Physical Education classes. Through this initiative, students collect and analyze data from their own physical activities and use these data to evaluate their performance, set goals, and improve their learning.

This study, therefore, aims to evaluate the effectiveness of PROJECT DATA-SPORT in enhancing literacy, numeracy, and life skills among Senior High School students.

METHODS

Research Design

This study employed a School-Based Action Research design using quantitative methods. Action research allows educators to implement interventions and evaluate their effectiveness in improving teaching practices and student learning outcomes (Mertler, 2023).

The research followed the four stages of action research:

- Planning
- Acting
- Observing
- Reflecting

PROJECT DATA-SPORT was implemented for six weeks during Physical Education classes, where students observed, recorded, and analyzed their sports and fitness performance data.

Participants of the Study

The respondents of the study were 40 Senior High School students enrolled during the School Year 2025–2026.

Participants were selected using purposive sampling, focusing on students enrolled in Physical Education classes where the intervention was implemented.

Research Instruments

The primary instrument used in this study was a researcher-made questionnaire designed to measure the effectiveness of PROJECT DATA-SPORT in enhancing students' analytical thinking, numeracy skills, and life skills competencies through sports performance observation and data tracking. The questionnaire consisted of structured statements aligned with the objectives of the study, particularly focusing on students' ability to analyze sports performance data, compute fitness indicators, interpret numerical results, and reflect on their physical performance. The instrument was organized into several sections, including analytical thinking through sports data analysis, improvement of numeracy skills through sports data tracking, development of life skills, and student engagement in sports performance observation and reflection.

The questionnaire utilized a four-point Likert scale to measure students' level of agreement with each statement. The scale included the following responses: 4 – Strongly Agree, 3 – Agree, 2 – Disagree, and 1 – Strongly Disagree. In addition to the survey questionnaire, the study also utilized sports performance tracking sheets that allowed students to record measurable indicators such as distance covered, time spent, repetitions completed, and other fitness-related data during Physical Education activities. Reflection logs were also used to capture students' insights and interpretations of their recorded performance data. The combination of these instruments ensured the collection of both quantitative performance data and reflective learning experiences.

Data Gathering Procedures

Before the implementation of the study, permission was secured from the school administration to conduct the research among Senior High School students enrolled in Physical Education classes. The researcher explained the objectives and procedures of the study to the participants and emphasized that their responses would be treated with confidentiality and used solely for research purposes. After securing consent, baseline observations of students' engagement in sports performance monitoring and data interpretation were conducted.

The implementation of **PROJECT DATA-SPORT** was carried out over a period of several Physical Education sessions. During the intervention phase, students were guided to observe, record, and track their sports performance using the provided performance tracking sheets. They documented measurable indicators such as activity duration, repetitions, speed, and fitness scores. Students were then encouraged to analyze the collected data and reflect on their performance improvements through structured reflection logs. At the end of the intervention period, the researcher administered the Likert-scale questionnaire to gather quantitative data regarding students' analytical thinking, numeracy skills, life skills development, and engagement in sports data analysis. The collected responses were subsequently organized, encoded, and prepared for statistical analysis using weighted mean computations.

Statistical Treatment

The weighted mean was used to determine the level of students' competencies.

Formula:

$$WM = \Sigma (f \times x) / N$$

Where:

WM = Weighted Mean responses of the Likert scale
f = frequency value
x = numerical value
N = total number of respondents

The weighted mean was interpreted using the following scale:

3.26 – 4.00 = Very High
2.51 – 3.25 = High
1.76 – 2.50 = Low
1.00 – 1.75 = Very Low

RESULTS

After determining the research designs and instruments used in this study, the researchers selected 40 Senior High School students as the sample population. The researchers presented the results of the survey data gathered, as shown below.

Table 1 Level of Students' Analytical Thinking through Sports Data Analysis			
Statements	Weighted Mean	Verbal Interpretation	
I can analyze my sports performance using recorded data.	3.42	Very High	
I can identify strengths and weaknesses based on my performance results.	3.38	Very High	
I can compare my performance data over time.	3.35	Very High	
I can interpret fitness indicators such as speed, endurance, and repetitions.	3.31	Very High	
I can draw conclusions from my recorded sports performance data.	3.40	Very High	
Overall Mean	3.37	Very High	

Table 2 Improvement of Numeracy Skills through Sports Data Tracking			
Statements	Weighted Mean	Verbal Interpretation	
I can compute my performance results, such as time and distance.	3.33	Very High	
I can calculate improvement in my fitness performance.	3.28	Very High	

I can organize data in tables or charts.	3.35	Very High	
I can interpret numerical information related to sports performance.	3.30	Very High	
I can apply mathematical skills when analyzing sports activities.	3.27	Very High	
Overall Mean	3.31	Very High	
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Table 3

Development of Life Skills through PROJECT DATA-SPORT

Statements	Weighted Mean	Verbal Interpretation	
The project helped me develop discipline in tracking my performance.	3.45	Very High	
I learned to set personal fitness goals.	3.40	Very High	
I became more responsible for monitoring my physical activity.	3.38	Very High	
The project improved my self-confidence in physical activities.	3.34	Very High	
I became more motivated to improve my fitness performance.	3.42	Very High	
Overall Mean	3.40	Very High	

Table 4

Student Engagement in Sports Data Observation and Reflection

Statements	Weighted Mean	Verbal Interpretation	
Recording sports performance data helped me understand my progress.	3.44	Very High	
Reflecting on my performance improved my learning.	3.39	Very High	
Data tracking made Physical Education activities more interesting.	3.36	Very High	
I became more engaged in Physical Education activities.	3.33	Very High	
I enjoyed analyzing my sports performance results.	3.37	Very High	
OVERALL MEAN	3.38	Very High	

DISCUSSIONS

Based on Table 1, students demonstrated a very high level of analytical thinking through sports data analysis, with an overall weighted mean of 3.37. The results indicate that students were able to interpret sports performance indicators, compare performance results, and draw conclusions from recorded data. The highest rating was observed in students' ability to analyze their own sports performance using recorded data, suggesting that the integration of sports performance tracking enabled students to become more reflective and analytical in evaluating their physical activities.

This finding supports the concept that Physical Education can serve as a platform for developing cognitive skills such as critical thinking and analytical reasoning when learning activities incorporate data interpretation and reflective analysis. According to Bailey (2006), structured physical education programs that integrate analytical activities can enhance both cognitive and physical learning outcomes among students.

Table 2 presents the improvement of students' numeracy skills through sports data tracking, which obtained an overall weighted mean of 3.31 interpreted as Very High. The findings suggest that students were able to apply mathematical concepts when computing sports performance indicators such as time, distance, and repetitions. Students also demonstrated the ability to organize numerical information and interpret performance data effectively.

These results indicate that the integration of sports data within Physical Education activities provides a meaningful context for applying mathematical skills in real-life situations. The ability of students to compute and interpret sports performance data shows that Physical Education can contribute to numeracy development beyond traditional classroom instruction. This finding is consistent with the perspective of McKenzie and Lounsbery (2013), who emphasized that performance monitoring and data analysis in Physical Education can support both academic learning and student motivation.

Table 3 reveals that PROJECT DATA-SPORT contributed significantly to the development of students' life skills, with an overall mean of 3.40 interpreted as Very High. The results indicate that students developed important personal competencies such as discipline, self-monitoring, goal setting, and responsibility for their own physical performance. The highest-rated indicator was the development of discipline in tracking performance data, suggesting that students became more accountable in monitoring their physical activities and progress.

These findings highlight that sports performance tracking not only improves academic competencies but also strengthens character development and personal responsibility among learners. Life skills such as goal setting and self-regulation are essential components of holistic education and are strongly supported through structured Physical Education programs. Previous studies have also emphasized that reflective practices in sports and physical activities promote personal growth and self-awareness among adolescents (Bandura, 1997).

Table 4 indicates that students exhibited a very high level of engagement in sports data observation and reflection activities, with an overall weighted mean of 3.38. The results show that recording and analyzing sports performance data made Physical Education activities more meaningful and engaging for students. Learners reported that reflecting on their own performance helped them better understand their progress and motivated them to improve their physical fitness. The high level of engagement suggests that integrating performance tracking into Physical Education lessons enhances students' interest and participation.

This approach transforms Physical Education from purely activity-based instruction into a more interactive and reflective learning experience. According to Creswell and Creswell (2023), learning environments that incorporate active participation and reflective analysis significantly improve student engagement and learning outcomes. Therefore, the integration of sports data observation and reflection can serve as an effective strategy to strengthen both physical and academic learning in Senior High School Physical Education.

CONCLUSIONS

The findings of this study indicate that PROJECT DATA-SPORT significantly enhanced students' analytical thinking, numeracy skills, and life skills competencies through the integration of sports performance observation, reflection, and tracking.

Students demonstrated strong engagement in analyzing sports data and applying mathematical concepts during Physical Education activities. The project also promoted reflective learning and personal goal setting among students.

The findings highlight the importance of integrating academic competencies into Physical Education instruction to promote holistic student development.

Schools are encouraged to adopt sports data tracking strategies as part of their Physical Education programs to strengthen interdisciplinary learning.

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Conflict of Interest

The authors declare that there is no conflict of interest.

Authorship Contribution

1. Conceptualization: xxxxxx Names of the authors
2. Data curation: xxxxxx
3. Formal analysis: xxxxxx
4. Acquisition of funds: xxxxxx
5. Research: xxxxxx
6. Methodology: xxxxxx
7. Project management: xxxxxx
8. Resources: xxxxxx
9. Software: xxxxxx
10. Supervision: xxxxxx
11. Validation: xxxxxx
12. Display: xxxxxx
13. Drafting - original draft: xxxxxx
14. Writing - proofreading and editing: xxxxxx

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