EDUCATION

Gear Up for Science: Boosting Grade 6 Pupils' Participation and Performance in Science Activities Using Passport Stamps

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Abstract

Passport Stamps has been recognized as a reinforcement-based instructional strategy that promotes learner participation, engagement, and academic performance in Science. This study determined the effect of Passport Stamps on the participation and performance of Grade 6 pupils in science activities during the School Year 2025–2026 in one of the public elementary schools in Ozamiz City. A quantitative pre-experimental one-group pretest-posttest research design was employed through instructional sessions integrating passport-based activities, collaborative learning tasks, hands-on science activities, and motivational reinforcement strategies. Forty Grade 6 pupils were purposively selected as participants and were assessed using researcher-made instruments measuring science performance and participation before and after the intervention. Statistical tools such as frequency, percentage, mean, standard deviation, and paired sample t-test were utilized in analyzing the gathered data. Prior to the implementation of Passport Stamps, learners demonstrated low science performance and poor participation in classroom activities. After the intervention, learners exhibited improvement in science performance, active engagement, task involvement, collaboration, and overall participation in science activities. Statistical analysis further indicated a significant difference between the learners' pretest and posttest results, confirming the positive effect of Passport Stamps on learners' classroom participation and academic performance. The study concludes that Passport Stamps is an effective instructional strategy for creating a more engaging, learner-centered, and motivating science classroom environment among Grade 6 pupils.

Keywords: Academic performance, engagement, participation, passport stamps, reinforcement strategy

1 Introduction

1.1 Context and rationale

Developing strong participation in science among elementary learners remains an essential goal in today's classrooms, especially as teachers work to make lessons more interactive and meaningful. Many Grade 6 pupils still struggle with consistent engagement in science activities, particularly in lessons that require hands-on involvement. Traditional methods often fail to sustain learners' interest and attention, revealing the need for strategies that motivate pupils and keep them actively involved throughout the learning process (Anthony et al., 2023).

Emerging instructional approaches highlight the importance of structured systems that support motivation and responsibility. Positive reinforcement strategies have been shown to improve participation by making learning experiences more rewarding and purposeful (Bohan & Smyth, 2023). Likewise, token-based or structured reward systems help learners stay focused and commit-

ted to completing required tasks, strengthening their engagement over time (Flores-Aguilar et al., 2023).

In science education, strong participation is crucial because learners must conduct trials, manipulate materials, explore concepts, and reflect on outcomes. Interactive learning models emphasize how tools that guide students through step-by-step tasks and provide visible progress markers can increase their willingness to participate actively (Xia & Qi, 2023; Flores-Aguilar et al., 2023). When pupils see their achievements and receive immediate recognition, their level of involvement and curiosity tends to rise (Anthony et al., 2023; Tan et al., 2022).

Given these insights, introducing a classroom tool such as the passport stamps offers a promising approach to strengthening engagement. By allowing pupils to earn stamps for completing activities, demonstrating understanding, and participating in discussions, the passport functions as a structured motivational tool that supports continuous involvement (Bohan & Smyth, 2023). Its design aligns with principles of gamification and guided progression, helping learners stay focused, motivated, and eager to participate in Science tasks (Flores-Aguilar et al., 2023; Xia & Qi, 2023). There remains a noticeable gap in practical, classroom-based strategies within existing literature, particularly in approaches that actively increase learner participation in science. Previous studies seldom provide rigorous, experience-driven methods that meaningfully engage pupils in exploring scientific concepts. In particular, the use of structured, activity-oriented tools such as learning passports to deepen involvement and sustain participation in elementary Science lessons appears to be underexplored in both research and classroom practice.

Anchored on the need for more engaging approaches in elementary Science instruction, this study introduces the passport stamps as an intervention designed to boost Grade 6 pupils' participation in Science. By integrating positive reinforcement, interactive task design, and gamified elements, the study aims to determine how this tool can strengthen pupils' involvement in learning simple machines (Anthony et al., 2023). Through this initiative, the research seeks to contribute to practical classroom strategies that enhance active engagement, support learner motivation, and enrich the overall science learning experience (Xia & Qi, 2023).

The present study aims to assess the effectiveness of the passport stamps in increasing engagement and participation among Grade 6 pupils during Science lessons. Through the integration of this structured learning tool into classroom activities, the study seeks to generate evidence on how interactive, task-based materials can encourage active involvement, strengthen motivation, and enrich pupils' understanding of scientific concepts. This initiative supports Sustainable Development Goal No. 4: Quality Education, which emphasizes the importance of inclusive and meaningful learning experiences that improve learner outcomes. By fostering higher participation and creating a more dynamic learning environment, the use of the passport stamps contributes to more equitable and effective Science instruction that empowers learners to maximize their potential.

To accomplish this, the study utilized an action research design, incorporating pre- and post-assessments of pupils' participation and engagement in Science activities. Classroom observations were conducted before and after implementing the passport stamps, and the collected data were analyzed to determine whether this structured tool could effectively enhance pupils' involvement, motivation, and active participation in learning tasks.

Ultimately, this research aimed to provide practical insights for teachers, school administrators, and curriculum developers on the instructional benefits of using the passport stamps in elementary Science classrooms. By examining pupils' engagement and participation, the study intends to offer

actionable recommendations for creating a more interactive, motivating, and productive learning environment.

1.2 Strategy

Participation and engagement in Science classrooms remain persistent challenges across various educational contexts. Internationally, studies highlight that learners often show declining motivation and low involvement in inquiry-based tasks, particularly in Science, when lessons lack interactive and hands-on components (Flores-Aguilar et al., 2023). At the national level, Philippine classrooms reflect similar concerns, with Grade 6 pupils frequently demonstrating limited participation in lessons that involve abstract concepts, which require both conceptual understanding and practical application (Anthony et al., 2023). Locally, in the classrooms observed, students show enthusiasm at the start of lessons but gradually disengage during sequential tasks, especially when there is no immediate recognition of progress or achievement. Traditional methods that rely solely on verbal reminders or teacher-led instructions are insufficient to sustain active participation and motivation.

To address these gaps, the strategy applied in this study centers on the passport stamps, an interactive stamps activity-based tool designed to promote engagement and participation in Science. The passport stamps function as a structured learning guide, where pupils earn stamps for completing hands-on activities, participating in discussions, and demonstrating mastery of scientific concepts (Bohan & Smyth, 2023). This approach leverages principles of positive reinforcement and gamification, creating a visible record of accomplishment that motivates learners to remain active participants throughout the lesson (Tan et al., 2022). The passport encourages self-monitoring, accountability, and peer collaboration, enabling pupils to take ownership of their learning while fostering consistent engagement.

The use of the passport stamps involves projecting or distributing the passport to pupils during lessons. Teachers guide learners through the tasks outlined in the passport, awarding stamps or recognition as each activity is completed successfully. Observations and assessments were conducted before and after the integration of the passport to determine its effectiveness in enhancing participation, engagement, and understanding of simple machines. The standard operating procedure (SOP) for the strategy includes introducing the passport at the start of the lesson, explaining its goals and reward system, monitoring pupil progress throughout tasks, and recording participation and achievement data for analysis.

1.3 Statement of the problem

This study aimed to determine the effect of the passport stamps on the participation and engagement of Grade 6 pupils in Science lessons during the School Year 2025–2026 in a public elementary school in Ozamiz City. Specifically, it sought to answer the following questions:

1. What is the learners' level of performance in Science lessons before the implementation of the passport stamps?
2. What is the learners' level of performance in Science lessons after the implementation of the passport stamps?
3. What is the learners' level of participation in Science activities before the implementation of the passport stamps?
4. What is the learners' level of participation in Science activities after the implementation of the passport stamps?

5. Is there a significant difference in the learners' level of performance before and after the implementation of the passport stamps?
6. Is there a significant difference in the learners' level of participation before and after the implementation of the passport stamps?

1.4 Null hypotheses

$H_0$1: There is no significant difference in the level of participation of Grade 6 pupils before and after the implementation of the passport stamp.

$H_0$2: There is no significant difference in the level of academic performance of Grade 6 pupils before and after the implementation of the passport stamp.

2 Research methodology

2.1 Research design

This quantitative approach employs a classroom-based action research approach using single pretest-posttest design to examine pupils' participation and engagement using the passport stamps. This pre-experimental design introduced the intervention as the independent variable, assesses a single group of respondents through a pretest, and evaluates the outcomes through a posttest (Marcos et al., 2024). In this study, a one-group pretest-posttest design was utilized to determine the effect of the passport stamps on Grade 6 pupils' involvement and motivation during Science lessons. Given the limited class size, this design allows for analyzing changes within the same group without requiring a separate control group.

2.2 Research setting

The study was conducted in one of the public elementary schools in Ozamiz City, Misamis Occidental, a government-operated institution that provides accessible and quality basic education from Grades 1 to 6. The school offers a conducive learning environment with well-ventilated classrooms, essential facilities, and a generally peaceful community setting that supports pupils' academic and socio-emotional development. It is staffed by dedicated and licensed teachers who implement varied instructional approaches to address learners' diverse needs. Serving children from different socio-economic backgrounds, the school plays an important role in shaping foundational skills and values, making it an ideal setting for classroom-based action research aimed at improving teaching practices and enhancing student learning outcomes.

2.3 Participants of the study

This study includes forty Grade 6 pupils from section Respect enrolled in the selected public elementary school in Ozamiz City, Misamis Occidental, for the school year 2025–2026. The participants were chosen using criterion purposive sampling. The following criteria were used in selecting the respondents of the study : forty (40) pupils who were officially enrolled in Grade 6 Respect class during the conduct of the study, ensuring that the respondents accurately represent the target group whose concentration and performance are to be improved through the intervention.

2.4 Research instrument

The research instruments used in the study are the following:

A. Participation Likert Scale Questionnaire (Appendix A). The researcher-designed Participation and Engagement Likert Scale Questionnaire was used to measure the Grade 6 pupils' level of participation and performance before and after using the passport stamps. It was administered to forty (40) Grade 6 Respect pupils across five sessions within four weeks. Each session included a 10-minute pretest, a 40-minute Science activity using the passport stamps, and a 10-minute posttest. The questionnaire consisted of ten (20) statements focusing on key participation and engagement behaviors, such as actively completing tasks, interacting with peers, following instructions, and staying involved in activities. Pupils would rate each statement using a 4-point Likert scale:

Scale interpretation:

- 4 – Strongly agree
- 3 – Agree
- 2 – Disagree
- 1 – Strongly disagree

B. Performance Assessment Test (Appendix B). The Performance Assessment Test evaluates pupils' academic performance before and after the implementation of the passport stamp. The test was aligned with the learning competencies in Science for Grade 6 and was administered during the five sessions as the Participation and Engagement Questionnaire. Each test has included short tasks and activity-based outputs designed to assess accuracy, completeness, and understanding of the concepts, and applying them in practical tasks. A 40-point scoring system was used to rate pupils' performance. To interpret the results, the hypothetical mean range and adjectival equivalents based on DepEd Order No. 8, s. 2015 were applied.

Scale interpretation:

- 27–30 – Outstanding
- 24–26 – Very satisfactory
- 21–23 – Satisfactory
- 16–20 – Fairly satisfactory
- 1–15 – Did not meet expectations

Content validity was established through review by subject matter experts in Science education, while construct validity was assessed through a pilot test with a similar group of Grade 6 learners. Reliability was determined using Cronbach's alpha to evaluate internal consistency. Additionally, feedback from both teachers and pupils were gathered to ensure that the questionnaire and performance tasks were clear, understandable, and appropriate for the targeted learning level.

C. Lesson Plan (Appendix C). The lesson plan served as the guide for implementing the passport stamps during classroom instruction. It details the objectives, activities, procedures, and integration of the passport to enhance participation and engagement in Science lessons. Across the eight sessions, each lesson begins with a pretest, followed by teacher-guided instruction and hands-on tasks in which pupils will use the passport stamps to track their progress. Activities such as identifying simple machines, performing experiments, completing group outputs, and reflecting on were structured to encourage active involvement and consistent participation. Each session concludes with a posttest to assess gains in engagement and mastery of the competency.

Through consistent implementation of the lesson plan, the study assess how the structured integration of the passport stamps influences pupils' participation, engagement, and mastery of the competency.

2.5 Data collection

Prior to data collection, approval was sought from the Misamis University Research Ethics Board (MUREB) to ensure compliance with institutional and ethical research standards. A formal letter was first be submitted to the Dean of the College of Education at Misamis University. Once the Dean's approval was obtained, the researcher seeked endorsement from the Program Head, followed by the Division Office, the School Principal, the Grade Level Head, and finally the class Adviser. Each authority's consent was secured before any data collection began. All correspondence include detailed information about the study's objectives, methodology, and scope to ensure transparency and adherence to institutional policies.

Following institutional approvals, informed consent forms were distributed to the parents or guardians of the forty Grade 6 Respect pupils, alongside assent forms for the pupils themselves. These forms ensured that parents formally permit their children's participation and that pupils voluntarily agree to take part in the study.

The study focused on enhancing participation, engagement, and mastery of the Grade 6 competency through the structured integration of the passport stamp. Data collection occurred over five sessions across two weeks. Each session began with a pretest to assess baseline participation and engagement, followed by teacher-guided instruction and hands-on activities using the passport. Sessions concluded with a posttest to evaluate immediate gains. While the pretests and posttests followed a consistent format, content vary to match the objectives and activities of each session. Additionally, a pre-assessment questionnaire and performance test was administered before the first session to measure baseline participation and mastery, and a post-assessment was conducted after the final session to evaluate overall improvement. Mean scores from the pretests and posttests were analyzed to determine changes in engagement, participation, and competency achievement. Standardized scoring rubric was used to ensure reliable and objective measurement of pupils' progress.

2.6 Ethical considerations

The study adhered to all ethical standards to protect the rights and well-being of participants. Approval from the Dean, Program Head, Division Office, School Principal, Grade Level Head, and class adviser was ensured compliance with institutional and research guidelines. Informed consent and assent procedures were strictly followed, with pupils and parents fully informed of the study's objectives, procedures, potential benefits, and any possible risks. Participation was voluntary, and pupils may withdraw at any time without penalty.

Confidentiality and anonymity were maintained throughout the study. Personal identifiers were excluded from all collected data, and pupils were assigned coded identifiers. Digital data were encrypted, and physical records were securely stored in a locked cabinet accessible only to the researcher. These measures complied with Republic Act No. 10173 (Data Privacy Act of 2012), safeguarding participants' privacy, dignity, and security.

The study was designed to minimize risks and prevent harm. Activities was conducted in a safe and supportive environment, and the use of the passport stamps were carefully monitored to avoid any physical, psychological, or emotional distress. By strictly observing these ethical considerations, the

researcher ensured the protection of participants while maintaining the integrity and credibility of the study.

2.7 Data analysis

This study used the following tools in analyzing the data gathered with the use of Jamovi Software.

Mean and standard deviation were calculated to determine the overall level of participation, engagement, and mastery of the Simple Machines competency among Grade 6 pupils before and after using the passport stamps.

Frequency and percentage were used to present the distribution of pupils across different levels of participation and engagement, providing a clear overview of how learners' involvement and performance change throughout the intervention.

A *paired sample t-test* was conducted to determine whether there is a significant difference in pupils' participation, engagement, and competency mastery before and after the implementation of the passport stamps, thereby evaluating the effectiveness of the strategy in enhancing classroom involvement and learning outcomes.

2.8 Dissemination plan

The results of the study were shared with school administrators, cooperating teachers, and the Grade 6 pupils and their parents through clear reports, focused discussions, and easy-to-understand summaries that highlight how the passport stamps enhance participation, engagement, and mastery of the competency. Proper consent and assent procedures were emphasized when presenting findings to pupils and parents to ensure ethical research standards were upheld. The study was disseminated to the university community and fellow educators through research presentations, seminars, and potential publication in institutional platforms, promoting evidence-based strategies for improving classroom involvement and learning outcomes in Science education.

2.9 Utilization plan

The findings of this study were applied to improve classroom management and instructional practices. The passport stamps was integrated as a regular tool to promote active participation, engagement, and mastery of science concepts among Grade 6 pupils. The strategies and insights gained from the study were shared with cooperating teachers through discussions, meetings, and mentoring sessions to support their professional development and encourage evidence-based teaching practices. Additionally, the results served as a reference for lesson planning, school-wide initiatives aimed at enhancing learner involvement, and future research focused on strengthening effective instructional strategies and student engagement in the classroom.

2.10 Cost estimates (Grade 6)

The estimated budget in the conduct of this study is broken down below from the personal money of the proponent. The proponent has a personal laptop and printer.

- 1 ream A4 US bond paper: Php 180.00
- 1 set 664 ink: Php 1,179.00
- 2 sliding folders: Php 15.00 × 2 (Php 30.00)
- Tokens (ballpen): Php 1,000.00

- Snacks: Php 1,500.00
- **Total: Php 3,889.00**

3 Results and discussion

3.1 Learner's level of performance in Science activities before the implementation of the passport stamps

Table 1 shows the learners' level of performance in Science activities before the implementation of the Passport Stamps. Overall, the learners obtained a Fairly Satisfactory level of performance, with an overall mean score of (M = 29.23, SD = 1.07). However, the majority of the learners were classified under the "Did Not Meet Expectations" level. This result indicate that most learners experienced difficulty in meeting the expected Science competencies prior to the implementation of the intervention. The concentration of learners at the lowest performance level suggests limited mastery of Science concepts, weak classroom engagement, and insufficient motivation during Science activities.

Several factors may have contributed to the learners' low performance in science activities. These include limited learner participation, lack of motivating instructional strategies, insufficient hands-on and collaborative learning experiences, and minimal use of reinforcement systems that encourage active involvement in classroom tasks. Traditional teacher-centered instruction may not have adequately addressed the learners' diverse learning needs, resulting in poor understanding and retention of scientific concepts. The higher variability among low-performing learners further suggests differences in prior knowledge of learning styles, and levels of academic support. To address these challenges, the passport stamps strategy was introduced as a reinforcement-based and learner-centered intervention designed to promote engagement, participation, and active involvement in Science activities.

Passport Stamps provide learners with visible recognition and reinforcement for completing classroom tasks, participating in discussions, and demonstrating understanding of Science concepts. This strategy encourages learners to become more motivated, engaged, and responsible in accomplishing Science-related activities. It emphasized that learners tend to demonstrate low academic performance and participation when structured reinforcement systems are absent (Tan et al., 2022). It highlights that traditional instruction without interactive and engaging strategies often lead to weak participation and poor learning outcomes (Flores-Aguilar et al., 2023). These studies support the use of reinforcement-based and interactive instructional approaches in improving learners' engagement and academic performance.

In summary, the low pretest performance of the learners highlights the limitations of traditional instructional approaches in promoting Science engagement and mastery of competencies. The findings justify the implementation of Passport Stamps as an intervention aimed at improving learners' participation, motivation, and academic performance in Science activities. The strategy provides a more interactive, learner-centered, and motivating learning environment that supports active participation and meaningful learning experiences.

Table 1. Level of performance in Science activities before the implementation of the passport stamps

Performance	Frequency	Percentage	M	SD
Very Satisfactory	2	5.0	35.5	0.71

Performance	Frequency	Percentage	M	SD
Satisfactory	2	5.0	32.0	0.00
Fairly Satisfactory	7	17.5	29.7	0.76
Did Not Meet Expectations	29	72.5	19.7	2.80
Overall Performance	40	100.00	29.23	1.07

Note: 38–40 (Outstanding); 35–37 (Very Satisfactory); 32–34 (Satisfactory); 29–31 (Fairly Satisfactory); 1–28 (Did Not Meet Expectations)

3.2 Learner's level of performance in Science activities after the implementation of the passport stamps

Table 2 show the learners' level of performance in Science activities after the implementation of the passport stamps. Overall, the learners achieved a Satisfactory level of performance, with an overall mean score of (M = 32.88, SD = 0.86). The results indicate improvement in the learners' science performance after the intervention, as more learners reached higher performance levels such as Outstanding, Very Satisfactory, and Satisfactory. Although some learners remained under the "Did Not Meet Expectations" category (n = 11, 27.5%, M = 26.7, SD = 0.90), a considerable number of learners demonstrated improved performance in Science activities, particularly those classified under the Satisfactory level (n = 6, 15.0%, M = 32.8, SD = 0.98). These findings suggest that the implementation of passport stamps positively influenced learners' academic performance, participation, and engagement during science instruction.

Several factors may have contributed to the improvement in learners' Science performance after the implementation of the intervention. These include increased learner motivation, active participation in classroom activities, reinforcement through rewards and recognition, and greater involvement in collaborative and hands-on Science tasks. The passport stamps strategy provided learners with visible progress markers that encouraged them to complete tasks, participate actively, and remain engaged throughout the learning process. The intervention also created a more interactive and learner-centered classroom environment that supported meaningful learning experiences and strengthened learners' confidence in performing Science-related activities.

Passport Stamps served as a reinforcement-based instructional strategy that motivated learners to become more engaged and responsible in accomplishing Science tasks. Reward-based systems have been shown to improve learner participation and academic performance by increasing motivation and engagement. Liu et al. (2022) emphasized that active learner engagement significantly predicts improved academic outcomes. Similarly, Bohan and Smyth (2023) highlighted that reinforcement-based interventions positively influence student behavior and classroom participation. These studies support the effectiveness of motivational and interactive instructional strategies in enhancing learners' academic performance and engagement in Science activities.

Despite the improvement in performance, a notable number of learners still remained under the "Did Not Meet Expectations" category, indicating that some learners may require additional academic support and intervention. This suggests that while the Passport Stamps strategy improved learner engagement and participation, differentiated instruction, remediation activities, peer tutoring, and continuous monitoring are still necessary to address the diverse learning needs of students. Therefore, teachers and school administrators are encouraged to strengthen learner-centered and reinforcement-based strategies to further improve Science performance and sustain learners' engagement in classroom activities.

In summary, the posttest results demonstrate that the implementation of Passport Stamps contributed to improved learner performance, engagement, and participation in Science activities. The findings support the effectiveness of reinforcement-based and interactive instructional approaches in promoting meaningful learning experiences and enhancing academic achievement among Grade 6 learners.

Table 2. Level of performance in Science activities after the implementation of the passport stamps

Performance	Frequency	Percentage	M	SD
Outstanding	7	17.5	38.6	0.79
Very Satisfactory	6	15.0	36.2	0.75
Satisfactory	6	15.0	32.8	0.98
Fairly Satisfactory	10	25.0	30.1	0.88
Did Not Meet Expectations	11	27.5	26.7	0.9
Overall Performance	40	100.00	32.88	0.86

Note: 38–40 (Outstanding); 35–37 (Very Satisfactory); 32–34 (Satisfactory); 29–31 (Fairly Satisfactory); 1–28 (Did Not Meet Expectations)

3.3 Learner's level of participation in Science activities before the implementation of the passport stamps

Table 3 shows the learners' level of participation in Science activities before the implementation of the passport stamps. Overall, the learners demonstrated a Poor level of participation, with an overall mean score of (M = 2.51, SD = 0.40). Among the participation constructs, Collaboration and Team Participation obtained the highest mean score (M = 2.65, SD = 0.33), while Task Involvement obtained the lowest mean score (M = 2.39, SD = 0.42). These results indicate that learners generally exhibited low participation across all areas of Science activities prior to the intervention. The findings suggest limited engagement in classroom discussions, collaborative activities, and Science-related tasks, indicating weak involvement and minimal active participation during science instruction.

Several factors may have contributed to the learners' low participation in Science activities. These include lack of motivating instructional strategies, limited opportunities for cooperative learning, insufficient learner-centered activities, and minimal use of reinforcement systems that encourage active classroom involvement. Traditional teacher-centered instruction may not have adequately provided learners with meaningful opportunities to interact, collaborate, and participate actively in science lessons. The low level of task involvement further suggests that learners may have lacked confidence, interest, and motivation in accomplishing Science-related activities. In addition, differences in learners' self-regulation, learning styles, and classroom interaction may have influenced their level of participation and engagement.

To address these challenges, passport stamps was introduced as a reinforcement-based and gamified instructional strategy designed to improve learner participation, collaboration, and active engagement in Science activities. The strategy provided learners with visible recognition and rewards for completing tasks, participating in discussions, and demonstrating involvement in classroom activities. Through the use of stamps and progress tracking, learners were encouraged to become more motivated, responsible, and engaged throughout the learning process. The intervention aimed

to create a more interactive and learner-centered classroom environment that supports meaningful participation and collaborative learning experiences.

Research supports the importance of reinforcement-based and interactive instructional approaches in improving learner engagement and participation. This emphasized that traditional classroom approaches often result in low learner motivation and participation when interactive and gamified strategies are absent (Flores-Aguilar et al., 2023). It highlighted that learners tend to demonstrate weak classroom engagement in the absence of structured reinforcement systems (Tan et al., 2022). These result further explained that learners with weak self-regulation and limited guided interaction often exhibit low participation in learning activities (Borchers et al., 2024). These findings justify the implementation of Passport Stamps as a learner-centered strategy that promotes active involvement, collaboration, motivation, and participation in science activities.

Table 3. Level of participation in Science activities before the implementation of the passport stamps

Constructs	M	SD	Remarks
Active Engagement	2.56	0.42	Poor
Task Involvement	2.39	0.42	Poor
Collaboration and Team Participation	2.65	0.33	Poor
Passport Engagement	2.44	0.42	Poor
Overall Level of Students' Participation	2.51	0.4	Poor

Note: 3.25–4.00 (Excellent); 2.50–3.24 (Very Good); 1.75–2.49 (Good); 1.00–1.74 (Poor)

3.4 Learner's level of participation in Science activities after the implementation of the passport stamps

Table 4 shows the learners' level of participation in Science activities after the implementation of the passport stamps. Overall, the learners demonstrated an Excellent level of participation, with an overall mean score of (M = 3.59, SD = 0.24). The results indicate a marked improvement in learners' active engagement, task involvement, collaboration, and overall participation in Science activities following the intervention. This suggests that learners became more responsive, involved, and consistent in performing Science-related tasks during classroom instruction.

The high level of participation observed across all constructs implies that the Passport Stamps strategy effectively enhanced learners' motivation and willingness to participate in classroom activities. The use of reinforcement, rewards, and visible progress tracking encouraged learners to actively engage in discussions, complete assigned tasks, and collaborate with their peers. The gamified nature of the intervention helped sustain interest and encouraged continuous involvement in Science learning experiences throughout the implementation period.

These results aligned with studies emphasizing the effectiveness of interactive and reinforcement-based instructional approaches. The results highlighted that gamified and interactive learning strategies enhance student motivation and engagement in classroom activities (Flores-Aguilar et al., 2023). This confirmed that reinforcement-based interventions positively influence student behavior and participation , (Bohan & Smyth, 2023), while emphasized that increased learner engagement contributes to improved academic participation and outcomes (Liu et al., 2022). It was further noted that structured reinforcement systems such as token economies help sustain positive classroom behavior and engagement over time (Tan et al., 2022).

Overall, the findings suggest that learners responded positively to the Passport Stamps strategy, resulting in sustained and meaningful participation in Science activities. This highlights the importance of incorporating interactive, collaborative, and reinforcement-based strategies in classroom instruction to maintain high levels of learner engagement. Teachers and school personnel are therefore encouraged to continue using and strengthening similar learner-centered approaches to further enhance participation and support effective Science learning experiences.

Table 4. Level of participation in Science activities after the implementation of the passport stamps

Constructs	M	SD	Remarks
Active Engagement	3.68	0.22	Excellent
Task Involvement	3.63	0.26	Excellent
Collaboration and Team Participation	3.50	0.24	Excellent
Passport Engagement	3.55	0.25	Excellent
Overall Level of Students' Participation	3.59	0.24	Excellent

Note: 3.25–4.00 (Excellent); 2.50–3.24 (Very Good); 1.75–2.49 (Good); 1.00–1.74 (Poor)

3.5 Significant difference in the learners' level of performance before and after the implementation of the passport stamps

Table 5 shows the significant difference in learners' level of performance before and after the implementation of the passport stamps. The results indicate a statistically significant improvement in learners' performance ($t = 7.70$, $p = 0.001$), as shown by the increase in the mean score from the pretest ($M = 22.9$, $SD = 5.83$) to the posttest ($M = 32.0$, $SD = 4.47$). This suggests that the passport stamps strategy effectively contributed to enhancing learners' academic performance in Science through improved motivation, engagement, and participation in classroom activities.

The improvement in learners' performance may be attributed to the reinforcement-based nature of the passport stamps strategy, which encouraged learners to actively participate, complete tasks, and engage in Science learning activities. The use of rewards and visible progress tracking helped increase learners' interest and sustained their involvement throughout the instructional process. As learners became more engaged, they were able to better understand and apply Science concepts, resulting in improved academic outcomes.

These results aligned with studies highlighting the role of engagement and reinforcement in improving academic performance. It emphasized that increased learner engagement and interaction strongly predict improved academic outcomes (Liu et al., 2022). Reinforcement-based strategies positively influence student behavior and learning performance (Bohan & Smyth, 2023). It further explained that improved engagement patterns contribute to better academic success (Xia & Qi, 2023), while stressed that structured reinforcement systems help sustain positive learning behaviors and active participation in classroom activities (Tan et al., 2022) .

Overall, the findings suggest that the passport stamps strategy is effective in improving learners' academic performance in Science. The significant difference between pretest and posttest results confirms the value of using motivational and reinforcement-based approaches in instruction. Teachers and school personnel are therefore encouraged to continue implementing similar learner-centered strategies, along with continuous monitoring and targeted instructional support, to further enhance learners' academic achievement.

Table 5. Significant difference in the learners' level of performance before and after the implementation of the passport stamps

Performance	M	SD	T-value	P-value	Decision
Before the Implementation of the Passport Stamps	22.9	5.83	7.70***	0.001	Reject H_{01}
After the Implementation of the Passport Stamps	32.0	4.47			

Note: ***p < 0.01 (Very Highly Significant); **p < 0.01 (Highly Significant); *p < 0.05 (Significant). $H_0$1: There is no significant difference in the level of academic performance of Grade 6 pupils before and after the implementation of the Passport Stamp.

3.6 Significant difference in students' engagement and participation before and after the implementation of the passport stamps

Table 6 shows the significant difference in students' engagement and participation before and after the implementation of the Passport Stamps. The results indicate that all variables Active Engagement, Task Involvement, Collaboration and Team Participation, and Passport Engagement yielded highly significant improvements (p = 0.001). These findings demonstrate that learners' classroom participation and engagement in Science activities significantly improved after the implementation of the intervention, reflecting a more active and involved learning behavior.

The improvement across all participation indicators suggests that the Passport Stamps strategy effectively enhanced learners' motivation and sustained their involvement in classroom activities. The use of gamified elements, reinforcement, and structured task completion encouraged learners to actively engage in discussions, collaborate with peers, and consistently participate in Science-related tasks. This indicates that learners responded positively to the intervention, resulting in stronger behavioral and academic engagement.

These results are consistent with studies emphasizing the effectiveness of interactive and reinforcement-based instructional strategies. Gamified and learner-centered approaches have been shown to increase student motivation and participation in learning tasks, while reinforcement systems such as token economies positively influence classroom behavior and engagement. Similarly, tangible reward systems have been found to significantly enhance learners' participation by encouraging consistent effort and active involvement in academic activities.

Overall, the consistently significant results suggest that structured motivational and reinforcement-based strategies are effective in sustaining learner engagement and improving classroom participation. The findings imply that teachers and school personnel should continue utilizing interactive, collaborative, and learner-centered instructional approaches, alongside reinforcement strategies, to further strengthen students' engagement and support more effective Science learning experiences.

Table 6. Significant difference in students' engagement and participation before and after the implementation of the passport stamps

Variables	T-value	P-value	Decision
Pre-Active Engagement Post-Active Engagement	15.3***	0.001	Reject Ho_2
Pre-Task Involvement Post-Task Involvement	17.7***	0.001	Reject Ho_2
Pre-Collaboration and Team Participation Post-Collaboration and Team Participation	12.7***	0.001	Reject Ho_2

Variables	T-value	P-value	Decision
Pre-Passport Engagement Post-Passport Engagement	14.3***	0.001	Reject Ho_2

Note: ***p < 0.01 (Very Highly Significant); **p < 0.01 (Highly Significant); *p < 0.05 (Significant). $H_0$2: There is no significant difference in the level of participation of Grade 6 pupils before and after the implementation of the Passport Stamp.

4 Summary, findings, conclusions and recommendations

4.1 Summary

This study aims to determine the effect of the Passport stamps on the participation and engagement of Grade 6 pupils in Science lessons during the School Year 2025–2026 in one of the public elementary schools in Ozamiz City. Specifically, the study sought to determine the learners' level of performance and participation before and after the implementation of Science Passport Stamps. The study utilized a quantitative pre-experimental one-group pretest-posttest research design. Forty Grade 6 learners in the section Respect who were enrolled during the academic year 2025-2026 served as the respondents of the study. A researcher-made questionnaire was used as the primary instrument in gathering data. The intervention was implemented for four weeks using Passport Stamps in boosting the participation of the pupils during instruction and improving their level of performance in Science subject. Mean, standard deviation, frequency, percentage, and paired t-test were used to analyze the gathered data. The findings revealed that learners' level of participation and performance has significant difference between the pretest and posttest scores.

4.2 Findings

This study yielded the following findings:

1. Before the implementation of the Passport Stamps, the learners demonstrated low performance and poor participation in Science activities, with most of them classified under the "Did Not Meet Expectations" level and showing limited engagement in active participation, collaboration, and task involvement.
2. After the implementation of the Passport Stamps, the learners showed improvement in both Science performance and participation, with more learners reaching higher performance levels such as "Satisfactory," "Very Satisfactory," and "Outstanding," while participation levels increased to "Excellent" across all engagement constructs.
3. There was a significant difference in the learners' performance and participation before and after the implementation of the Passport Stamps, indicating that the strategy effectively improved learners' engagement, motivation, and academic performance in Science activities.
4. After the implementation of the Passport Stamps, the Grade 6 learners demonstrated a high level of participation in Science activities, as reflected in their active involvement in classroom discussions, completion of assigned tasks, participation in group activities, and engagement in Science-related learning activities.
5. There was a significant difference in the learners' level of performance before and after the implementation of the Passport Stamps, indicating that the intervention contributed to an improvement in the learners' Science performance.

6. There was a significant difference in the learners' level of participation before and after the implementation of the Passport Stamps, indicating that the intervention positively influenced the learners' engagement and active involvement in Science activities.

4.3 Conclusions

Based on the findings of the study, the following conclusions are drawn:

1. The learners initially exhibited low performance and poor participation in Science activities, with most learners classified under the "Did Not Meet Expectations" level.
2. The implementation of the Passport Stamps resulted in improved Science performance and participation, as reflected in the increased number of learners attaining higher performance levels and an "Excellent" level of participation.
3. The significant difference between the pre-intervention and post-intervention results confirmed that the Passport Stamp strategy positively contributed to the enhancement of learners' Science performance, engagement, and participation.
4. The learners demonstrated a high level of participation in science activities after the implementation of the Passport Stamps, particularly in classroom discussions, task completion, group activities, and other Science-related learning activities.
5. The significant difference in the learners' level of performance before and after the implementation of the Passport Stamps indicates that the intervention contributed to improved Science performance.
6. The significant difference in the learners' level of participation before and after the implementation of the Passport Stamps indicates that the intervention positively influenced learners' engagement and active involvement in Science activities.

4.4 Recommendations

Based on the findings and conclusions of the study, the following recommendations are offered:

1. Science teachers may integrate Passport Stamp strategies and other reinforcement-based activities in classroom instruction to improve learners' participation, motivation, and academic performance in Science activities.
2. School principals may support the implementation of interactive and motivational instructional strategies such as Passport Stamps by providing instructional resources, teacher training, and learner support programs that promote active engagement in Science learning.
3. Future researchers may conduct related studies using larger groups of learners, longer intervention periods, and additional variables to further examine the effectiveness of Passport Stamps in improving learners' Science participation and academic performance.
4. Teachers may continuously use motivational reinforcement strategies such as Passport Stamps to sustain learners' interest, confidence, and active participation during Science instruction and other learning areas.
5. Schools may encourage collaborative and learner-centered classroom activities that allow learners to interact, cooperate, and actively engage in the teaching-learning process through the use of innovative instructional strategies.

6. Future researchers may explore the effectiveness of Passport Stamps in other subject areas and grade levels to determine its wider applicability in improving learner participation, engagement, and academic performance.

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