

Navigating the Influence of the Scoreboard Reward System on Students' Attention Span in Science

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Abstract

This study investigates the quantitative influence of the Scoreboard Reward System (SRS) on the attention span of Grade 11 Senior High School students during science classes. With the integration of the Behaviorist Theory, which clearly emphasizes the use of reinforcement for desired behaviors, this study employed a quasi-experimental pretest-posttest design. The two classes used in this study were selected through purposive sampling: one as the control group—traditional instruction—and one as the experimental group—SRS intervention. Both groups underwent a 20-item pretest and posttest to measure their attention span during science class. Before the implementation of the SRS, both classes—control group ($M = 11.20$, $SD = 2.45$) and experimental group ($M = 11.45$, $SD = 2.31$)—showed similar low attention spans during science class. However, after the implementation of the SRS, the experimental group has significantly improved to a posttest mean of 17.30 ($SD = 1.98$), and an average increase of +5.85 points, which is equivalent to a 17.4% increase. Moreover, the independent t-test result showed a significant difference between the two classes ($t = 6.78$, $p < 0.01$), confirming positively the effectiveness of Scoreboard Reward System. Generally, the results suggest that the integration of SRS is considered an effective classroom management strategy for increasing the attention span and the engagement of the students, specifically, during science class. The study offers very significant insights for educators in seeking instructional tools that positively reinforce students' behavioral patterns and improve focused classroom instruction.

Keywords: Scoreboard Reward System; attention span; classroom engagement; participation

1. Introduction

In the ever-evolving landscape of education, maintaining student engagement and attention in the classroom remains a pressing challenge. One approach gaining attention for its effectiveness in fostering motivation and sustained focus is the use of gamification strategies, particularly the Scoreboard Reward

System (SRS). Gamification, the integration of game mechanics into non-game contexts, has been shown to enhance student interest, participation, and behavior management in classrooms (Deterding et al., 2011). The SRS operates by tracking and rewarding positive behaviors, creating a competitive yet collaborative environment that appeals especially to younger learners (Zainuddin et al., 2020). This system not only encourages students to stay attentive but also fosters a sense of accountability and shared goals during class activities, which is why teachers in some schools use this kind of strategy as one of their instructional materials in maintaining the attention span of the students during classes.

Attention span, defined as the amount of time a person can concentrate on a task without becoming distracted, is a crucial factor in academic performance (Rosen et al., 2013). However, studies show that students' attention spans have been gradually declining due to the increasing presence of digital distractions and shorter content formats in media (Carr, 2020). This issue is particularly evident in classroom settings where students often struggle to remain focused during extended instructional periods. Thus, educators are in urgent need of strategies that can reinvigorate classroom dynamics and maintain students' cognitive engagement. Implementing a scoreboard reward system offers a timely solution, promoting continuous on-task behavior through positive reinforcement and healthy competition. One of the goals in education is presented in the Sustainable Development Goals. Sustainable Development Goal 4 (SDG 4) highlights the creation of effective learning environments that support student engagement and success. That is why, teachers must always take into consideration the enhancement of the attention span in the classroom.

The rationale for this study stems from the contemporary classroom's need to address disengagement and short attention spans, issues exacerbated by the transition between online and in-person learning modalities during and after the pandemic (Bond, 2020). The scoreboard reward system presents a relevant, cost-effective, and engaging intervention for teachers striving to improve classroom behavior and academic outcomes, especially when engaging with diverse students who are in need of immediate academic attention. Given the increasing demand for classroom management tools that work in real-time and support diverse learners, this study explores how such a system can influence student attentiveness.

Moreover, educational research supports the use of reward-based interventions for managing classroom behavior. According to Skinner's behaviorist theory, reinforcement strengthens desired behavior, and systems like SRS align well with this principle (Skinner, 1953). Recent findings indicate that gamified reward systems not only improve classroom conduct but also significantly enhance cognitive engagement and motivation among learners (Hamari et al., 2014). By providing immediate feedback and visible recognition, scoreboard systems appeal to students' intrinsic and extrinsic motivations, making learning experiences more interactive and impactful.

Educational landscape, particularly pertaining to students' attention span and engagement, has become increasingly difficult due to numerous distractions and shift in learning modalities brought by the digital age, etc. with the attention span directly linked to academic success, educators are in search of innovative strategies to promote sustained focus in classroom settings. The Scoreboard Reward System, a gamified behavioral intervention, offers a promising solution by reinforcing positive behaviors and encouraging active participation through healthy competition. However, its effectiveness in improving the attention span of the students remains underexplored. That is why the objective of this study is to navigate the influence of the Scoreboard Reward System on the students' attention span in science. By doing so, the researcher aims to offer a practical insight for educators seeking sustainable methods to enhance classroom environments and enhance learner outcomes. Through a deeper understanding on the influence of the

Scoreboard Reward System to students' attention span in science, this study contributes to ongoing efforts to refine instructional strategies in alignment with the cognitive and behavioral needs of 21st-century learners.

1.1 Statement of the Problem

This study aimed to navigate the influence of Scoreboard Reward System in enhancing the attention span of the students in Science during the School Year 2023-2024 in Tacloban City, Leyte. Specifically, it sought to answer the following.

- 1.1.1 What is the level of attention span of students before the implementation of the Scoreboard Reward System in Science?
- 1.1.2 What is the level of attention span of students after the implementation of the Scoreboard Reward System in Science?
- 1.1.3 Is there a significant difference in the level of attention of students before and after the implementation of the Scoreboard reward system in Science?

1.2 Theoretical Framework

This study is grounded on three theoretical perspectives that explain the connection between the integration of the reward system, attention span, and the motivation of the students during classroom settings, specifically using Behaviorist Theory. This framework helped the researcher in understanding how the Scoreboard Reward System (SRS), as an instructional strategy, may positively influence the attention span of the students during classes. Behaviorist Theory emphasizes that learning and behavior are shaped through conditioning, particularly positive reinforcement, where students receive immediate feedback and rewards for exhibiting desirable behaviors like attentiveness, participation, and cooperation. Furthermore, recent studies reinforce this perspective. According to Hussain et al. (2022), behavior reinforcement strategies such as point-based reward systems significantly improved the engagement and task completion of the students in a classroom setting. The scoreboard format aligns with this by reinforcing attentiveness through observable and consistent rewards.

2. Methodology

2.1 Research Design

This study utilizes a quasi-experimental design, specifically the pretest-posttest design, to investigate the effect of Scoreboard Reward System (SRS) on the attention span of the students during classes in science. By comparing the performance and attention behaviors of a control group—traditional instruction—and an experimental group (with SRS), the study aimed to navigate whether the reward system has a significant impact on the attention span of the student.

2.2 Research Local and Participants

This study was conducted in some selected schools around Tacloban City, specifically the Grade 11 Senior High School Students. The participants were chosen through the use of purposive sampling. This method is appropriate for educational interventions when specific characteristics—such as similar academic backgrounds—are required (Etikan, Musa, & Alkassim, 2016). One class will serve as the experimental group, exposed to the Scoreboard Reward System, while the other group will serve as the control group, taught using conventional classroom strategies. Each class consists of approximately 30-40 students.

2.3 Research Instrument

To collect valid and reliable data for this research study, the researcher utilized instruments that effectively measured the attention span of the students and their engagement in their learning environment.

An appropriate data gathering procedure has provided a significant insight into the impact of the implementation of the Scoreboard Reward System on the behavioral and performance aspects of the students. Hence, this study used the Pretest-Posttest method. Furthermore, Pretest-Posttest method/assessment—teacher-made and aligned with the curriculum—was administered to the students to evaluate their academic performance and retention during Science class, and by extension, the scores from this method served as the indirect measures and reflections on the attention span and participation of the students (Bransford, Brown, & Cocking, 2000).

2.4 Data Gathering Procedure

This study followed a structured three-phase procedure to ensure an organized implementation of the Scoreboard Reward system, before and after the classroom setting, through accurate data collection procedure. During the Pre-Intervention phase, official permission and informed consent were obtained from the school authorities and also from the participants of this study. The baseline data was collected through the pretests and the attention span observations for both the experimental and the control group. In the intervention phase, which was executed in four weeks, the experimental group was exposed to the Scoreboard Reward System, during the daily lessons, which also incorporates visual tracking and immediate feedback observation through points, based on Whole Brain Teaching strategies (Biffle, 2013), while the control group continued with the traditional instruction practices. Finally, in the Post-Intervention phase, the posttests and the final observation were conducted and evaluate the changes in the attention span and the academic performance of the students for both the experimental group, who had received the implementation of the Scoreboard Reward System, and the control group, who remained from the traditional instruction practices.

2.5 Data Analysis

Pretest and posttest scores were analyzed using paired sample t-tests and independent sample t-tests. In a paired sample t-test, the pretest and posttest scores within each group were compared. It determines whether there is a significant difference in the mean scores before and after the implementation of the Scoreboard Reward System. Meanwhile, an independent sample t-test was utilized to compare the posttest scores between the experimental and control groups. It determines whether the difference in outcomes between the two independent groups is statistically significant. On the other hand, the researcher of this study also utilizes the mean to get the central average value from the pretest-posttest score for both the experimental and control groups. It is, by adding all the scores in the data set and dividing it by the total number of values, which significantly summarizes the scores of the students before and after the implementation of the Scoreboard Reward System.

2.6 Ethical Consideration

The ethical integrity of this research was prioritized throughout its design, implementation, and evaluation phases. Given that the study involved human participants—specifically Grade 11 senior high school students—it was imperative to adhere to established ethical standards in educational research, as outlined by the British Educational Research Association (BERA, 2018).

Before the data gathering began, informed consent was obtained from both the students and their respective guardians. A formal consent letter was distributed, clearly explaining the purpose of the study, the nature of their participation, the procedures involved (such as pretests, posttests, classroom observations, and survey completion), the potential benefits and risks, and their right to withdraw at any time without penalty. Students were assured that their participation was entirely voluntary and that no grades or academic standing would be affected by their decision to participate or withdraw.

The researcher ensured that students understood the study in age-appropriate language, emphasizing their autonomy and rights as participants. For participants under legal age, parental or guardian consent was required alongside student assent, complying with ethical standards for involving

minors in research.

Confidentiality and anonymity were strictly observed. No names or personally identifying information were recorded in the data or used in any publication or presentation of the results. Each student was assigned a code number during data processing, and only aggregate results were reported. All data were securely stored and accessible only to the researcher for analysis purposes.

Additionally, during classroom observations and intervention sessions, the researcher maintained a non-intrusive role to avoid disrupting normal learning dynamics. The intervention—the Scoreboard Reward System—was designed to align with educational goals and posed no harm or discomfort to the students. On the contrary, it promoted motivation, engagement, and teamwork.

Finally, after the study concluded, participants were debriefed and informed about the findings and implications of the research. Their participation was acknowledged with appreciation, and feedback was welcomed. Through these practices, the study maintained a strong ethical foundation, protecting the dignity, rights, and welfare of all participants involved.

3. Results and Discussion

The following section presents the analyzed data gathered from the implementation of the Scoreboard Reward System (SRS) and its impact on the attention span of Grade 11 students in Earth Science classes. The study utilized both quantitative and qualitative instruments, including pretest and posttest scores, classroom observation checklists, and student perception surveys. These tools were designed to capture variations in attention-related behaviors such as eye contact, note-taking, verbal participation, and on-task conduct before and after the intervention. The results are organized according to the research questions and supported by statistical interpretations and student feedback.

3.1 Level of Attention Span Before the Implementation of the Scoreboard Reward System

Table 1. Level of Attention Span Before the Implementation of the SRS

Group	Mean Pretest Score	Standard Deviation	Description
Experimental	11.45	2.31	Low
Control	11.20	2.45	Low

The similarity in mean scores suggests that both groups started with a comparable level of attention and prior knowledge before the intervention was administered to them during Science class. With the 20-item pretest administered to them, this validates group equivalence before testing the Scoreboard Reward System. Hence, the two groups have almost the same attention span before the implementation of the Scoreboard Reward System.

3.2 Level of Attention Span After the Implementation of the Scoreboard Reward System

Table 2. Level of Attention Span after the implementation of the SRS

Group	Mean Posttest Score	Standard Deviation	Mean Gain	Paired t-test (p-value)
Experimental	17.30	1.98	+5.85	$p < 0.01$ (significant)
Control	13.15	2.27	+1.95	$p > 0.05$ (not significant)

The paired sample t-test for the experimental group indicated a statistically significant improvement in posttest scores after the use of the Scoreboard Reward System. On the other hand, the result for the level of the attention span for the control group, did not improve significantly as the statistics presented above while still adapting the traditional instruction in contrast with the result coming from the experimental group. Therefore, this suggest that implementation of the SRS has significantly impacted the attention span of the students during science class.

3.3 Significant Difference Between the Experimental and Control Groups

Table 3. Difference between the experimental and control group

Comparison	t-value	p-value	Interpretation
Experimental vs. Control	6.78	$p < 0.01$	Significant difference

The table above shows a significant comparison between the experimental and the control group. The t-value of 6.78 signifies a large difference between the two groups, while the p-value of less than 0.01 shows that the difference is statistically significant at the 1% level. This only means that there is strong evidence on the implementation of the Scoreboard Reward System having a positive significant effect on the attention span and academic performance of the experimental group, compared to the control group that remained with the traditional instruction practices.

3.4 Discussion

The result of this study significantly shows that the integration of Scoreboard Reward System (SRS) had a positive influence to the attention span of Grade 11 Senior High School students during science class. According to Behaviorist Theory (Skinner, 1953), behavior can be shaped through reinforcement, thus, the SRS functioned as a form of positive reinforcement towards the attention span of the students by providing an immediate feedback and reaction during on-task-behavior, such as maintaining eye contact with the teacher during discussion, participating in class necessarily, and staying engaged with the lesson from the beginning up until the end.

Additionally, before the implementation has occurred, both the control group and experimental group showed similar low attention span levels as shown in their comparable pretest scores. This situation supports the internal validity of the study, suggesting that both classes started from the traditional type of instruction, and any observed difference can only be seen during the post-intervention (posttest). This is supported by the pre-test that was administered to the two classes—experimental and control group—with a 20-item test in science.

Furthermore, after the implementation of the SRS, the experimental group showed a positive outcome and improved attention span and performance, with a posttest mean of 17.30, and an approximately 51.1% from the traditional instruction. On the other hand, the control group improved slightly to 13.15, which is equivalent to a 17.4% increase in attention span and performance. This significant difference demonstrates that traditional teaching strategies alone may not be enough to address the declining attention span of the students, especially in today's classroom environment, where students' diversity is very much observable.

Moreover, the independent sample t-test ($t = 6.78$, $p < 0.01$) significantly confirmed the difference between the two classes, which positively shows the influence of the Scoreboard Reward System as a motivational instructional strategy during classroom settings. These results are aligned with the literature on classroom engagement, emphasizing that gamified systems provide an intrinsic motivation, foster accountability, and improve classroom student behavior, which are all observed in the experimental group (Hamari et al., 2014) and (Zainuddin et al., 2020).

Thus, this study also reinforces the practical applicability of the Behaviorist perspective in classroom settings. As Hussain et al. (2022) stated, a structured point-based system can be a powerful motivator, especially when applied consistently and visibly. Hence, the Scoreboard Reward System, by giving points as a reward to the students, improves not just peer accountability, but also the sense of competitiveness, which by extension, helps students sustain focus and participate actively in classroom activities.

Generally, this study demonstrates that the SRS is an effective intervention for the purpose of significantly increasing the attention span of the students during classroom engagement. Its utilization

and integration into instructional strategies offers an avenue for educators seeking practical methods to combat students who have low attention span and classroom engagement, which significantly affects their improved learning outcomes.

3.5 Conclusion

Before the implementation of the Scoreboard Reward System, both the experimental and the control group showed similar low attention spans during science class, as shown in the result of their close pretest mean scores of 11.45 and 11.20, respectively, which confirms the equivalence of the two classes. Meanwhile, after the intervention, the experimental group exhibited a more evident improvement on the attention span of the students, with a mean gain of +5.85 and a statistically significant p-value of $p < 0.01$. However, the control group, which had received the traditional type of instruction, only had a little improvement and showed a statistically insignificant gain of +1.95, with a p-value of $p > 0.05$. On the other hand, the independent sample t-test revealed a very significant difference between the two classes with a t-value of $t = 6.78$, with a p-value of $p < 0.01$ from their posttest scores. Generally, these results only indicate that the integration of the Scoreboard Reward System had a positive outcome towards increasing the attention span of the students, thereby improving their class participation and performance during science classes.

3.5 Recommendation

Combining all of the insights taken from the results of this study, supported by related studies, the researcher of this study recommends that the Scoreboard Reward System shall be integrated into regular classroom instruction, especially in science subjects, to strictly enhance the engagement of the students and their attention span. This is because the significant improvement that was observed in the students who were exposed to the Scoreboard Reward System shows that it is an effective motivational and behavioral tool. Additionally, the teachers and the administration of the school are highly encouraged to utilize and adapt the Scoreboard Reward System to suit the various learning styles of the students, which will support better academic outcomes.

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