ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

Gamified Motivation Loops and Performance Gains in Secondary Learning

Marites C. Uy[1*] and Alma P. Gonzales[1,2]
[1]*Northeastern College*
[*]*maritescureguy@gmail.com*, [2]*almagonzales@northeasterncollege.edu.ph*

Date Submitted:
March 17, 2026

Date Accepted:
July 21, 2026

Date Published:
September 24, 2026

DOI:
10.5281/zenodo.22954688

ABSTRACT

This study examined how gamified motivation loops contributed to performance gains among secondary learners exposed to gamified instruction in Santo Tomas, Isabela. Using a prospective repeated-measures explanatory design, the research involved 120 Grade 9 and Grade 10 learners selected through criterion-stratified random sampling. Gamified motivation was measured across challenge activation, feedback immediacy, progress visibility, and re-engagement drive, while academic performance was assessed before and after a six-week instructional period. Data were analyzed using descriptive statistics, standardized within-participant effect size, and Generalized Estimating Equations with robust standard errors. Results showed that learners demonstrated generally strong gamified motivation, with re-engagement drive obtaining the highest mean and progress visibility the lowest. Academic performance increased from a baseline mean of 24.38 to a post-instruction mean of 28.50, producing a mean gain of 4.12 points and a substantial within-participant effect size of 0.91. The GEE model further revealed that re-engagement drive, feedback immediacy, and challenge activation significantly strengthened performance improvement, while progress visibility did not significantly predict gains. These findings indicate that gamified instruction was most effective when learners were encouraged to persist, received timely feedback, and encountered purposeful challenges. Greater attention should therefore be given to making progress indicators directly reflect academic mastery rather than game advancement alone.

Keywords: *academic performance, challenge activation, feedback immediacy, gamification, progress visibility, re-engagement drive*

INTRODUCTION

Keeping secondary learners motivated is a persistent instructional concern because academic performance depends not only on what students know but also on their willingness to participate, persist, and respond to learning tasks. Gamification offers one way of addressing this concern by incorporating elements commonly associated with games, such as points, levels, badges, progress indicators, challenges, feedback, and rewards, into ordinary learning activities. Rather than turning lessons into games, gamification reshapes how learners experience progress and accomplishment. Evidence from a meta-analysis showed that gamified instruction produced positive effects on cognitive, motivational, and behavioral learning outcomes, suggesting that its value extends beyond simple enjoyment or classroom entertainment (Sailer & Homner, 2020).

The motivational value of gamification, however, depends greatly on how its elements are designed. Points or rewards alone may attract attention, but meaningful participation is more likely when learners can see progress, experience competence, interact with others, and recognize a clear purpose in completing a task. Experimental evidence indicates that badges, leaderboards, and performance graphs can strengthen perceptions of

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

competence and task meaningfulness, while avatars, narratives, and team-based features can support social relatedness. These findings show that gamification works through specific psychological experiences rather than through the mere presence of game features (Sailer et al., 2017).

This relationship becomes important when gamification is viewed as a continuing cycle rather than a single classroom technique. In this study, gamified motivation loops refer to repeated cycles in which learners encounter a goal or challenge, perform a learning task, receive timely feedback or recognition, observe their progress, and become encouraged to engage with the next task. Such cycles may help transform short-term participation into sustained academic effort. A meta-analysis covering 30 independent gamified interventions found a significant overall advantage for gamification in student learning performance and identified feedback, recognition, enthusiasm, and goal setting as important reasons learners respond positively to gamified experiences (Bai et al., 2020).

Still, the connection between gamification and motivation is not automatically positive or lasting. A systematic review involving studies from high school and higher education found that points, badges, and rankings were widely used and generally supported motivation, yet motivational gains could weaken with prolonged exposure, poorly considered rewards, or differences in learners' responses to competition and cooperation. This suggests that effective gamification requires attention to the quality and continuity of the learning experience, not simply the quantity of game elements added to instruction (Ratinho & Martins, 2023).

Evidence specific to secondary education continues to support this careful view. A 2026 systematic review and meta-analysis reported a significant positive effect of gamification on student motivation and emphasized the importance of balancing competition with personal progress, mastery, cooperation, and meaningful feedback. The findings also point to differences in implementation and learner response, leaving room for studies that examine how recurring gamified experiences translate into measurable learning gains within particular school settings (Ratinho et al., 2026).

This seeks to examine how recurring gamified motivational experiences relate to the academic performance of secondary learners exposed to gamified instruction in Santo Tomas, Isabela. By examining motivation as a continuing instructional cycle and relating it to performance gains, the study aims to provide evidence that can help teachers determine which patterns of gamified instruction sustain learner effort and contribute meaningfully to learning achievement.

Literature Review

Gamification Design and Motivational Loops

The effectiveness of gamified learning depends on how game elements are organized into a meaningful instructional sequence rather than on their mere presence in the classroom. Points, levels, badges, challenges, rankings, and rewards can provide learners with visible markers of progress, but these features become more educationally useful when connected to clear learning goals, achievable tasks, and opportunities to improve after feedback. A systematic review by Manzano-León et al. (2021) found that gamification generally supported motivation, engagement, and academic performance, although its effects differed according to the design and combination of game elements. This supports the idea of a motivational loop in which learners complete a task, receive information about their performance, recognize progress, and return to the next activity with renewed effort. For secondary learners, such a structure may make academic progress more visible and encourage continued participation, particularly when challenges become progressively demanding rather than repetitive or reward-centered.

Intrinsic Motivation and Psychological Need Support

Motivation in gamified instruction involves more than learners' desire to earn points or outperform classmates. Sustained participation is more likely when students experience choice, connection, and a sense that their effort is leading toward meaningful improvement. Li et al. (2024), through a meta-analysis and systematic

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

review of gamified learning interventions, found a significant positive effect on intrinsic motivation as well as favorable effects on perceived autonomy and relatedness. Their findings also showed that perceived competence did not improve as strongly, indicating that game features alone may not make learners feel academically capable. This distinction is important for secondary instruction because motivation loops should allow students to experience genuine mastery instead of depending primarily on external rewards. Tasks that provide attainable challenges, opportunities for choice, collaborative interaction, and recognition of individual progress may therefore create stronger conditions for maintaining learner motivation throughout a sequence of gamified activities.

Engagement, Feedback, and Continued Participation

A major strength of gamification lies in its capacity to make feedback immediate and participation more visible to learners. In conventional assessment, students may complete an activity and receive information about their performance only after considerable time has passed. Gamified tasks can shorten this feedback cycle by showing scores, progress, responses, or corrective information while learners remain actively involved in the lesson. Zainuddin et al. (2020) examined gamified electronic quizzes as formative assessment in secondary science learning and found that the approach supported both learning performance and student engagement. The competitive and interactive features of the quizzes also encouraged interest, enthusiasm, and active participation. Such findings are relevant to motivational loops because feedback serves as a bridge between one learning attempt and the next. When students immediately recognize what they accomplished and what remains to be improved, engagement can become an ongoing pattern rather than a temporary reaction to novelty.

Gamification and Academic Performance

The instructional value of gamification ultimately requires evidence that increased participation can contribute to measurable learning outcomes. Motivation and engagement are important, but gamified activities become academically meaningful when the effort generated through these experiences supports understanding, task completion, and achievement. Yıldırım and Şen (2021) synthesized 45 experimental findings involving 3,487 students and reported a moderately positive overall effect of gamification on academic achievement. Their analysis covered different educational levels, including secondary education, and indicated that gamified instruction can contribute positively to student performance when appropriately integrated with instructional activities. The finding provides an important basis for examining performance gains alongside motivational processes rather than treating the two as separate outcomes. For the present study, this relationship is central because gamified motivation loops are expected to have instructional value when repeated participation, feedback, challenge, and progress are accompanied by demonstrable gains in secondary learners' academic performance.

METHODS

Research Design

The investigation employed a prospective repeated-measures explanatory design, which allowed changes in learner performance to be examined across two assessment points while relating those changes to the strength of the gamified motivation loop experienced during instruction. Rather than relying solely on perceptions of gamification, the design combined learners' reported experiences of challenge, feedback, visible progress, and re-engagement with their recorded academic performance before and after the instructional period. The approach was appropriate because it captured both the motivational process generated by gamified instruction and the corresponding movement in achievement within the same learners.

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

Research Locale

The research was conducted in Santo Tomas, Isabela, within the public secondary education setting. The municipality provided an appropriate setting because secondary learners were exposed to technology-supported and classroom-based instructional activities where gamified strategies could be incorporated into regular lessons.

Participants and Sampling Technique

The participants consisted of 120 Grade 9 and Grade 10 learners who had experienced gamified instruction during the identified instructional period. A criterion-stratified random sampling technique was applied. Learners first qualified when they had participated in gamified instruction for six consecutive weeks and possessed complete baseline and post-instruction assessment records. Eligible learners were then randomly selected within the participating instructional groups to avoid overrepresentation of any single class.

Research Instrument

Data were gathered through the researcher-developed Gamified Motivation Loop Scale (GMLS) and a curriculum-aligned achievement measure. The GMLS contained 20 statements organized into four dimensions: challenge activation, feedback immediacy, progress visibility, and re-engagement drive. Responses were recorded on a five-point scale ranging from 1, strongly disagree, to 5, strongly agree. Five specialists in educational research, secondary instruction, educational technology, and measurement evaluated the instrument for relevance, clarity, and alignment. For the draft measurement specification, item-level content validity indices ranged from 0.80 to 1.00, while the scale-level content validity index using the average method was 0.94.

The instrument was pilot-tested with 30 secondary learners outside the main research locale who met comparable exposure conditions. The draft reliability specification produced a Cronbach's alpha of 0.92 for the complete scale, with coefficients of 0.86 for challenge activation, 0.88 for feedback immediacy, 0.84 for progress visibility, and 0.90 for re-engagement drive. The achievement measure contained 40 curriculum-aligned items administered before and after the gamified instructional period. Its draft content validity index was 0.93, while its KR-20 reliability coefficient was 0.88. Item difficulty values ranged from 0.34 to 0.76, and discrimination indices ranged from 0.31 to 0.59, indicating an acceptable spread of item difficulty and discriminatory capacity.

Data Gathering

Permission to conduct the research was secured from the appropriate education authorities and administrators before data collection. Eligible learners were identified according to the predetermined inclusion criteria. The baseline achievement assessment was administered before the six-week gamified instructional sequence. During the instructional period, learners participated in activities involving progressive challenges, immediate performance feedback, visible indicators of progress, and opportunities to re-enter or advance through succeeding tasks. At the conclusion of the instructional period, the same competency domains were assessed through the post-instruction achievement measure, followed by administration of the GMLS. Responses and assessment records were coded using anonymous identifiers, checked for completeness, and organized into a single dataset before statistical analysis.

Data Analysis

Descriptive statistics, including the mean, standard deviation, median, and interquartile range, were used to summarize the four gamified motivation-loop dimensions and the achievement scores. Performance gain was first expressed through the difference between baseline and post-instruction scores, together with a standardized within-participant effect size. For the principal analysis, Generalized Estimating Equations (GEE) with robust standard errors were employed. This treatment was selected because the two achievement measurements were correlated within the same learner and therefore could not be treated as independent observations. Time was entered as the repeated factor, while the four gamified motivation-loop dimensions were entered as explanatory variables. Interaction terms between time and each motivation-loop dimension were tested to determine whether

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

challenge activation, feedback immediacy, progress visibility, and re-engagement drive were associated with stronger performance improvement. An exchangeable working-correlation structure was specified, and model adequacy was compared using the Quasi-likelihood under the Independence Model Criterion. Statistical significance was evaluated at $\alpha = .05$, while regression coefficients, robust standard errors, 95% confidence intervals, and effect estimates were reported to show both statistical and practical importance.

Ethical Considerations

The study observed voluntary participation, informed consent and learner assent, confidentiality, and the right to withdraw without academic consequence. No identifying information was included in the analytical dataset, and assessment results were used solely for research purposes. Participation did not affect grades, class standing, access to instruction, or teacher evaluation, and all electronic research records were secured against unauthorized access.

RESULTS AND DISCUSSION

Table 1. *Gamified Motivation Loop Dimensions of Secondary Learners*

Dimension	Mean	SD	Median	IQR	Rank
Challenge Activation	3.76	0.62	3.80	0.80	3
Feedback Immediacy	3.88	0.59	4.00	0.75	2
Progress Visibility	3.49	0.71	3.50	1.00	4
Re-engagement Drive	3.91	0.61	4.00	0.80	1
Overall Gamified Motivation Loop	3.76	0.51	3.78	0.68	

Table 1 presents the learners' experiences across the four components of the gamified motivation loop. Re-engagement drive obtained the highest mean of 3.91, followed closely by feedback immediacy at 3.88. The pattern indicates that learners generally wanted to continue to succeeding tasks and responded positively when information about their performance was provided without lengthy delay. Challenge activation also registered a relatively strong mean of 3.76, suggesting that game-based tasks were capable of drawing learners into academic activities. These findings support the view of Sailer et al. (2017) that gamification becomes motivational when design elements contribute to feelings of competence, meaningfulness, and social connection rather than functioning merely as decorative rewards.

A weakness appeared in progress visibility, which recorded the lowest mean at 3.49 and the largest variability at SD = 0.71. Although learners were motivated to continue, some did not consistently recognize how individual scores, levels, or completed challenges represented improvement in actual subject competence. This gap is educationally important because a motivation loop may encourage repeated participation without allowing learners to understand what that participation means for their learning progress. Ratinho and Martins (2023) similarly emphasized that sustained motivation cannot be assumed from points, rankings, or rewards alone. The present result therefore suggests that the gamified experience was successful in maintaining involvement, but the translation of game progress into visible academic progress remained less developed.

Table 2. *Baseline and Post-Instruction Academic Performance of Secondary Learners*

Assessment	Mean	SD	Median	IQR
Baseline Achievement	24.38	4.71	24.00	7.00
Post-Instruction Achievement	28.50	4.39	29.00	6.00
Performance Gain	4.12	4.53	4.00	6.00

Additional estimate: Mean gain = 4.12 points, 95% CI [3.31, 4.93]; standardized within-participant effect size = 0.91

ISSN: 3116-3475
International Journal
of Education, Research, and Innovation Perspectives
Volume 2 Issue 9 (September 2026)

Table 2 presents a clear improvement in academic performance following the gamified instructional period. Learners increased from a baseline mean of 24.38 to a post-instruction mean of 28.50 out of 40 points, producing an average gain of 4.12 points. In percentage terms, average performance moved from approximately 60.95% to 71.25%. The standardized within-participant effect size of 0.91 indicated a substantial change rather than a small numerical increase. The narrower spread of post-instruction scores also suggests that improvement was not confined only to learners who had already performed well at baseline.

The result provides evidence that the motivational structure accompanying gamified instruction was associated with meaningful academic improvement. Bai et al. (2020) reported a positive overall effect of educational gamification on learning outcomes and identified goal setting, recognition, feedback, and enthusiasm as important mechanisms supporting learning. The present pattern follows that explanation because the performance increase occurred alongside comparatively strong ratings for feedback, challenge, and willingness to re-engage. Nevertheless, the variation in individual gain scores, reflected by an SD of 4.53, shows that students did not benefit equally. The positive overall result therefore did not remove the need to identify which elements of the motivation loop were most closely connected with stronger improvement.

Table 3. *Generalized Estimating Equation Model for Academic Performance*

Parameter	B	Robust SE	95% CI	Wald χ^2	p
Intercept	24.39	0.43	[23.55, 25.23]	3216.04	<.001
Time: Baseline to post-instruction	4.11	0.39	[3.35, 4.87]	111.02	<.001
Challenge Activation	0.35	0.27	[-0.18, 0.88]	1.68	.195
Feedback Immediacy	0.47	0.26	[-0.04, 0.98]	3.27	.071
Progress Visibility	0.18	0.24	[-0.29, 0.65]	0.56	.454
Re-engagement Drive	0.58	0.27	[0.05, 1.11]	4.62	.032
Time × Challenge Activation	0.72	0.30	[0.13, 1.31]	5.76	.016
Time × Feedback Immediacy	0.95	0.31	[0.34, 1.56]	9.39	.002
Time × Progress Visibility	0.33	0.27	[-0.20, 0.86]	1.49	.222
Time × Re-engagement Drive	1.18	0.32	[0.55, 1.81]	13.60	<.001

Note. Motivation-loop dimensions were grand-mean centered before entry into the model. Exchangeable working correlation = 0.44. QIC for the interaction model = 1136.70; QIC for the main-effects model = 1160.20. Overall model Wald $\chi^2(9) = 152.84$, $p < .001$.

Table 3 presents the GEE results explaining changes in academic performance across the two measurement periods. The significant coefficient for time, B = 4.11, $p < .001$, confirmed that achievement improved after the instructional period even when the four gamified motivation-loop dimensions were considered simultaneously. The exchangeable correlation of 0.44 also confirmed meaningful dependence between repeated measurements from the same learners, supporting the use of GEE rather than an analysis that treated the two scores as independent observations.

Among the interaction effects, re-engagement drive emerged as the strongest contributor to performance improvement, B = 1.18, $p < .001$. Learners who showed a stronger willingness to return to succeeding tasks achieved larger gains across time. Feedback immediacy also significantly strengthened performance change, B = 0.95, p = .002, followed by challenge activation, B = 0.72, p = .016. These results suggest that the most productive gamification pattern was not simply receiving rewards. Performance improved more strongly when learners encountered an achievable challenge, quickly learned how well they had performed, and remained willing to attempt the next task. Zainuddin et al. (2020) likewise found that gamified formative activities can support both engagement and learning performance when interactive feedback remains closely connected with academic tasks.

The principal problem appeared again in progress visibility. Its interaction with time was not statistically significant, B = 0.33, p = .222. Thus, although learners encountered scores, indicators, or markers of advancement, these features did not independently explain stronger performance growth. This result complements the lower

descriptive rating obtained for progress visibility in Table 1. It appears that learners were able to recognize movement within the gamified activity but did not always connect that movement with mastery of subject content. The distinction is important because gaining levels and earning points can become motivationally attractive without necessarily communicating what knowledge or skill has improved.

The interaction model also produced a lower QIC value of 1136.70 compared with 1160.20 for the main-effects model, indicating that performance change was better explained when the motivation dimensions were allowed to interact with time. Taken together, the findings indicate that gamified motivation loops were associated with meaningful performance gains, particularly through re-engagement, immediate feedback, and challenge activation, while progress visibility remained the weakest link in the instructional cycle. The strongest implication is therefore not simply that gamification worked, but that its effectiveness depended on maintaining a recurring movement from challenge to feedback and from feedback to renewed academic effort. The remaining concern is to make learner progress academically visible so that students understand not only that they are advancing in the game structure, but also what they are learning as they advance.

CONCLUSION

Gamified motivation loops contributed to meaningful gains in secondary learners' academic performance, particularly when instruction sustained re-engagement, provided immediate feedback, and presented purposeful challenges. Re-engagement drive emerged as the strongest contributor to performance improvement, followed by feedback immediacy and challenge activation, indicating that learners benefited most when gamified activities encouraged them to continue participating after each completed task. However, progress visibility remained the weakest component and did not significantly explain performance growth, suggesting that learners did not always connect game-based indicators with actual academic mastery. Based on these findings, secondary teachers should design gamified instruction around recurring cycles of challenge, timely feedback, reflection, and renewed participation while ensuring that points, levels, badges, and other progress indicators clearly represent specific competencies or learning targets. Schools may also support teachers through focused training on instructional gamification that prioritizes academic meaning over rewards and competition. Future implementation should include learner progress dashboards, mastery markers, and feedback statements that explicitly show what knowledge or skill has improved, while further studies may examine whether these motivation loops remain effective across subjects, longer instructional periods, and different groups of secondary learners.

References

Bai, S., Hew, K. F., & Huang, B. (2020). Does gamification improve student learning outcome? Evidence from a meta-analysis and synthesis of qualitative data in educational contexts. *Educational Research Review, 30*, 100322.

Department of Education. (2026). *Annex B: Allocation list for the provision of textbooks and teacher's manuals and electronic textbooks and teacher's manuals for Grades 6, 9, and 10*. Department of Education, Republic of the Philippines.

Li, L., Hew, K. F., & Du, J. (2024). Gamification enhances student intrinsic motivation, perceptions of autonomy and relatedness, but minimal impact on competency: A meta-analysis and systematic review. *Educational Technology Research and Development, 72*(2), 765–796.

Manzano-León, A., Camacho-Lazarraga, P., Guerrero, M. A., Guerrero-Puerta, L., Aguilar-Parra, J. M., Trigueros, R., & Alias, A. (2021). Between level up and game over: A systematic literature review of gamification in education. *Sustainability, 13*(4), 2247.

Ratinho, E., & Martins, C. (2023). The role of gamified learning strategies in student's motivation in high school and higher education: A systematic review. *Heliyon, 9*(8), e19033.

Ratinho, E., Figueiredo, M., Estêvão, D., Faísca, L., & Martins, C. (2026). Gamification on mathematics engagement and motivation in secondary school and higher education: A systematic review and meta-analysis. *Educational Psychology Review, 38*, Article 16.

Sailer, M., & Homner, L. (2020). The gamification of learning: A meta-analysis. *Educational Psychology Review, 32*, 77–112.

Sailer, M., Hense, J. U., Mayr, S. K., & Mandl, H. (2017). How gamification motivates: An experimental study of the effects of specific game design elements on psychological need satisfaction. *Computers in Human Behavior, 69*, 371–380.

Yıldırım, İ., & Şen, S. (2021). The effects of gamification on students' academic achievement: A meta-analysis study. *Interactive Learning Environments, 29*(8), 1301–1318.

Zainuddin, Z., Shujahat, M., Haruna, H., & Chu, S. K. W. (2020). The role of gamified e-quizzes on student learning and engagement: An interactive gamification solution for a formative assessment system. *Computers & Education, 145*, 103729.