

BEYOND ACADEMIC ACHIEVEMENT: INTEGRATING GAMIFICATION, PROBLEM-BASED LEARNING, AND SOCIAL-EMOTIONAL LEARNING TO ENHANCE 21ST-CENTURY COMPETENCIES AMONG BTLED STUDENTS

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ABSTRACT. *This study addresses a critical gap in contemporary education systems, where students often lack essential 21st-century skills. These deficiencies extend beyond academic performance (AP) to include critical thinking, collaboration, communication, creativity, and social-emotional competencies. To bridge this gap, innovative teaching strategies are needed to foster both academic achievement and holistic development. The research evaluates the effectiveness of the Triadic Teaching Approach (TTA), an innovative teaching approach that integrates Gamification, Problem-Based Learning (PBL), and Social-Emotional Learning (SEL) within the framework of the Partnership for 21st Century Learning (P21). A quasi-experimental matched-group design was employed at a Science and Technology University in Southern Philippines, involving second-year Bachelor of Technology and Livelihood Education students. Participants were divided into control and experimental groups. Both groups received PBL as the baseline instructional strategy, while the experimental group experienced additional gamification and SEL integration. Data were collected through pre-tests and post-tests to assess academic performance AP, LIS, and SEL skills. Results revealed that the experimental group demonstrated significantly higher scores in LIS and SEL compared to the control group, indicating that the TTA effectively enhances students' engagement and emotional competencies. Meanwhile, AP showed a statistically significant improvement from pretest to posttest when compared within the group. However, the enhancements in AP when compared to control and experimental group were not statistically significant, suggesting that the integrated approach significantly impacts social and emotional skill development rather than academic performances. It is recommended that curriculum implementers may focus on training pre-service educators to adopt these approaches effectively. Future research may also explore longitudinal impacts and expand to diverse educational settings to enhance generalizability and understanding of these teaching strategies' potential.*

Keywords—academic performance, gamification, learning and innovation skills, problem-based learning, quasi-experimental research, social-emotional learning, triadic teaching approach

INTRODUCTION

As educational systems respond to rapid social, technological, and workplace changes, teaching approaches that deliberately cultivate 21st-century competencies have become increasingly important. Singhal [1] emphasized that innovative, student-centered teaching can create relevant learning environments that prepare learners not only for academic requirements but also for future roles that demand adaptability, informed decision-making, and continuous learning.

Despite this emphasis, a persistent gap remains between the competencies expected of graduates and the proficiency levels demonstrated by many students [2]. Deficiencies in critical thinking, communication, collaboration, creativity, and social-emotional competence may weaken both academic success and workforce readiness [3].

Evidence from the Philippines further illustrates this concern. Development Asia reported that employers frequently encounter difficulty recruiting workers with adequate socio-emotional competencies [4]. Similarly, employer surveys have identified communication, adaptability, decision-making, and problem-solving as recurring weaknesses among recent graduates [5]. These findings support the need for educational approaches that extend beyond content transmission and intentionally develop cognitive, interpersonal, and emotional competencies [6].

To respond to this need, the present study examined a Triadic Teaching Approach (TTA) that integrated gamification, problem-based learning (PBL), and social-emotional learning (SEL) within the Partnership for 21st (P21) Century Learning framework. The approach was designed to support academic performance (AP) while strengthening learning and

innovation skills (LIS), particularly critical thinking, communication, collaboration, and creativity [7].

Each component of the TTA served a distinct instructional purpose. Gamification was used to encourage participation and sustained engagement [8], [9]. PBL required students to apply concepts to authentic problems and work collaboratively toward defensible solutions [10]. SEL activities were incorporated to develop self-awareness, self-management, social awareness, relationship skills, and responsible decision-making [11]. The intervention was implemented in EDU212: Facilitating Learner-Centered Teaching, a professional education course in the Bachelor of Technology and Livelihood Education (BTLED) program. Offered during the first semester of the second year, the course provides an appropriate context for developing learner-centered pedagogical competencies and higher-order thinking skills [12, 13].

Developing these competencies requires coordinated support from both teachers and institutions. Okros [14] argued that effective teaching depends not only on technological integration but also on the teacher's ability to establish intellectual and emotional connections with learners. Klibthong and Agbenyega [15] likewise maintained that teacher education programs should equip pre-service teachers with inclusive, innovative, and student-centered strategies. Teacher education institutions therefore have an important role in preparing future educators who can think critically, teach reflectively, and model the competencies they expect learners to develop.

Overall, the TTA aligns with the P21 framework by combining PBL, gamification, and SEL in a holistic and future-oriented learning experience. Rather than treating LIS and SEL as incidental outcomes, the approach makes

opportunities for problem-solving, collaboration, reflection, and emotional regulation explicit within instruction.

This study aimed to evaluate the effectiveness of the TTA in improving students' LIS, SEL competencies, and AP. Specifically, it addressed the following research questions:

1. Is there a significant difference in the student's AP, SEL skills, and LIS before and after the implementation of TTA for both control and experimental group?
2. Is there a significant difference in the AP, SEL skills, and LIS between the control group and the experimental group after the implementation of TTA?

LITERATURE REVIEW

The Demand for 21st-Century Skills in the Labor Market

Technological advancement and globalization have increased the demand for competencies that extend beyond disciplinary knowledge. Employers increasingly value critical thinking, collaboration, communication, adaptability, and emotional intelligence because these competencies support innovation and effective performance in changing work environments [2, 3]. Nevertheless, a mismatch persists between the skills sought by employers and those demonstrated by many graduates.

In the Philippine context, reports have highlighted employers' difficulty in finding applicants with strong socio-emotional competencies [4]. International employer surveys similarly identify communication, adaptability, decision-making, and problem-solving as common deficiencies among recent graduates [5]. Such gaps may complicate the transition from education to employment and contribute to underemployment and reduced productivity [16, 17].

The skills gap also has implications for institutional and national competitiveness. Knowledge-driven organizations depend on workers who can learn continuously, collaborate across disciplines, and respond creatively to unfamiliar problems. Without these competencies, industries may have limited capacity to adapt to emerging technologies and changing global demands [18].

The 21st-Century Skills Framework

The Partnership for 21st Century Learning framework identifies four broad domains: core subjects and 21st-century themes; learning and innovation skills; information, media, and technology skills; and life and career skills [7, 19]. Within this framework, creativity, critical thinking, communication, and collaboration are treated as central competencies for responding to complex academic, social, and workplace demands.

The framework promotes the integration of content knowledge with applied learning. LIS develops creativity, critical inquiry, communication, and collaborative problem-solving; information and media literacy supports responsible participation in digital environments; and life and career skills emphasize adaptability, initiative, leadership, and cross-cultural competence [20]. Together, these domains describe a multidimensional view of learner readiness that extends beyond conventional academic achievement.

The Role of Teachers and Institutions in Fostering 21st-Century Skills

Teachers and educational institutions play a central role in developing 21st-century competencies. Their responsibility extends beyond presenting information to designing learning environments in which students can inquire, collaborate, create, and reflect [21]. Student-centered and technology-supported instruction can provide repeated opportunities to apply these competencies in meaningful contexts [22].

Klibthong and Agbenyega [15] emphasized that educators should empower students to become active and critical participants in learning. This requires professional development, reflective teaching, inclusive instructional design, and institutional support. Rifin et al. [23] further argued that teachers must update their expertise, engage in interdisciplinary learning, and build meaningful relationships with students.

Okros [14] similarly underscored the importance of engaging both intellect and emotion. Accordingly, innovative pedagogies such as project-based learning, collaborative problem-solving, and creativity-focused instruction should address cognitive, social, and emotional development rather than treating these domains as separate [24, 25].

The Integrated Approach for Academic and Holistic Learning

The TTA integrates gamification, PBL, and SEL to support academic learning and holistic development. The model assumes that cognitive engagement, social interaction, and emotional regulation are interdependent in sustained learning. It is consistent with the P21 framework [19] and the OECD Learning Compass 2030 [22], both of which emphasize agency, creativity, adaptability, collaboration, and responsibility.

Gamification

Gamification incorporates elements such as points, levels, badges, feedback, and rewards into non-game learning activities to strengthen motivation and engagement [26]. When aligned with learning outcomes, challenge and reward structures can make participation more visible and encourage persistence [27]. Previous studies have reported positive effects on motivation, group cohesion, and learning outcomes, although the effectiveness of gamification depends on instructional design and implementation quality [9, 28, 29].

Problem-Based Learning

PBL engages students in authentic and often ill-structured problems that require inquiry, evidence-based reasoning, and collaboration. It connects theory with practice by asking learners to apply knowledge in realistic contexts [10, 30]. Through reflection and cooperative problem-solving, PBL may strengthen analytical, communication, and interpersonal competencies while supporting deeper conceptual understanding.

Social-Emotional Learning

SEL focuses on competencies related to self-awareness, self-management, social awareness, relationship skills, and responsible decision-making [31]. Structured SEL activities can contribute to supportive learning environments, stronger interpersonal relationships, and more effective emotional regulation [32, 33]. Integrating SEL within academic instruction makes emotional and social competencies explicit

learning targets rather than assumed by-products of classroom participation.

METHODOLOGY

This study used a quasi-experimental matched-group pretest-posttest design to examine LIS, SEL competencies, and AP. Two second-year BTLED sections with comparable prior academic performance were selected and assigned to control and experimental groups. Both groups received PBL as the baseline instructional strategy, whereas the experimental group received additional gamification and structured SEL activities. The analytical degrees of freedom reported in Tables 1-4 correspond to 66 participants enrolled in EDU212 during School Year 2023-2024. The survey instrument included a demographic section, an LIS scale adapted from Kelley *et al.* [34], and an SEL scale adapted from Zhou and Ee [35]. AP was measured using a validated 70-item teacher-made test aligned with the EDU212 syllabus and table of specifications.

Instrument reliability and validity were examined before the main analysis. Cronbach's alpha coefficients indicated strong internal consistency for the LIS dimensions: critical thinking ($\alpha = .92$), collaboration ($\alpha = .90$), communication ($\alpha = .90$), and creativity ($\alpha = .87$). The SEL dimensions also showed acceptable to strong internal consistency: responsible decision-making ($\alpha = .85$), relationship management ($\alpha = .75$), self-awareness ($\alpha = .82$), self-management ($\alpha = .87$), and social awareness ($\alpha = .85$). Discriminant validity was assessed using the heterotrait-monotrait ratio, with all reported values below .85. For the AP test, classical item analysis was used to examine item difficulty and discrimination, while experts reviewed the instrument for content alignment. Eight non-participant BTLED students completed a preliminary clarity check.

Data collection followed institutional requirements for informed consent, confidentiality, voluntary participation, and data protection [36, 37]. Paired-samples t-tests were used to examine pretest-posttest changes across the combined sample. Because the two groups were pooled for this analysis, the results represent overall change over time and cannot be attributed exclusively to the TTA. ANCOVA was then used to compare posttest outcomes between groups while controlling for corresponding pretest scores; the adjusted group effect, rather than the intercept, was used to evaluate the added contribution of the experimental condition. Assumptions of normality, homogeneity of variance, linearity, and homogeneity of regression slopes were reported as satisfied.

RESULTS AND DISCUSSION

RQ 1. Comparison of the Student's Learning and Innovation Skills, Social-Emotional Learning Skills, and Academic Performance Before and After the Implementation of TTA

H₁: There is a significant pretest-posttest difference in LIS, SEL competencies, and AP across the combined sample.

The paired samples t-test for learning and innovation skills (Pair 1) showed a significant improvement in posttest scores, supporting the research hypothesis. The mean increase of 0.291 points ($SD = 0.634$) indicates enhanced critical thinking, creativity, and problem-solving abilities. This aligns with the focus on 21st-century skills essential for global competitiveness [20]. Innovative strategies like problem-based learning stimulate curiosity and resourcefulness, helping students adapt to complex challenges [38].

Table 1: Paired Sample T-Test to Measure the Difference between the Pre-test and Post-Test Performance of the Students across the Variables investigated

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	SD	Std. Error Mean	95% CI Interval LowerUpper				
Pair 1 LIS	LIS pretest - LIS posttest	-.291	.634	.0781	-.447	-.13507	-3.727	65	.000
Pair 2 SEL	SEL pretest - SEL posttest	-.332	.558	.0687	-.469	-.19508	-4.834	65	.000
Pair 3 AP	AP pretest - AP posttest	-6.394	11.312	1.392	-9.175	-3.613	-4.592	65	.000

Results for social-emotional learning skills (Pair 2) also showed significant gains from pre-test to post-test, confirming the hypothesis. The mean increase of 0.332 points ($SD = 0.558$) reflects growth in interpersonal skills, self-awareness, and emotional regulation [39]. Supportive teaching strategies foster positive classroom climates that enhance students' social-emotional development beyond academics [40]. The t-test for academic performance (Pair 3) revealed a significant difference between pre- and post-test scores, confirming that the TTA positively influenced academic achievement. The mean gain of 6.394 points ($SD = 11.312$) suggests improved learning outcomes, consistent with studies emphasizing innovative, learner-centered teaching [1].

Therefore, the results of the pair sampled t-tests highlight the positive effect of the triadic teaching approach on student

academic performance, social-emotional learning skills, and learning and innovation skills. Accordingly, H_1 is accepted for all three variables. These findings show the complicated benefits of adopting learner-centered and innovative instructional approaches in educational settings [1]. Moreover, continued research and implementation efforts should focus on refining this strategy to enhance student outcomes and prepare learners for success in the 21st century.

RQ 2. Comparison of the social-emotional learning skills, learning and innovation skills and academic performance between the control group and the experimental group after the implementation of TTA

H₂: There is a significant difference in posttest AP, SEL competencies, and LIS between the control and experimental groups.

Social-Emotional Learning Competencies

Mean scores between the control group ($M = 4.55$, $SD = 0.513$) and the experimental group ($M = 5.72$, $SD = 0.321$) reveal a significant difference suggesting that the experimental group significantly outperformed the control group, showing a substantial improvement in their SEL after intervention. The ANCOVA analysis further support which includes the groups and the covariate (SEL_Pre, representing

pre-test scores), was statistically significant with an F-value of 4.102 and a p -value of .021, meaning that the model as a whole explains a significant portion of the variance in the post-test scores (Partial Eta Squared = .115), thus the H_2 hypothesis is accepted. This demonstrates that the intervention, alongside the pre-test scores, had a distinguished effect on the outcomes.

Table 2: Descriptive Statistics for the SEL Skills for Both Control and Experimental Groups

Groups	Mean	Std. Deviation	N
Control	4.55	0.513	33
Experimental	5.72	0.321	33
Total	5.09	0.446	66

Table 3: ANCOVA Analysis for the Comparison of Post-Test Scores in SEL Skills for Both Control and Experimental Groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial ETA Squared
Corrected Model	1.489 ^a	2	.745	4.102	.021	.115
Intercept	10.203	1	10.20	56.22	.000	.472
SEL_Pre	.278	1	0.278	1.532	.020	.024
Groups	.900	1	0.900	4.959	.038	.173

a. R Squared = .215 (Adjusted R Squared = .177)

The significant adjusted group effect provides evidence that the structured SEL component added value beyond the common PBL condition. The intervention included reflective journaling, collaborative discussion, role-based teamwork, and engagement with realistic scenarios. Weekly journal prompts asked students to examine their emotional responses to learning tasks, challenges during group work, and strategies for managing frustration or stress. Rubrics focused on emotional awareness, coping strategies, and depth of reflection, making SEL competencies explicit and assessable rather than incidental [41].

Students also completed collaborative activities such as Developmental Quest and the Motivation Matters talk show. Rotating roles—including facilitator, recorder, and presenter—created structured opportunities to practice accountability, empathy, communication, and conflict resolution. Peer-evaluation forms and instructor rubrics documented observable indicators of social awareness, relationship skills, and responsible decision-making.

The predominantly female, early-adult sample may have influenced how students responded to emotionally engaging and collaborative activities [42, 43]. Since demographic characteristics were not tested as moderators, this explanation may be treated as a possible contextual factor rather than a demonstrated cause. Replication with more diverse groups is needed to determine whether the SEL effect is consistent across learner populations.

Learning and Innovation Skills

Descriptive statistics in table 4 show a clear difference between the control group ($M = 4.88$, $SD = 0.50$) and the

experimental group ($M = 5.47$, $SD = 0.43$). This difference highlights the intervention's success in enhancing the LIS of students in the experimental group compared from the control group.

The ANCOVA results as presented in Table 5 show that the overall model, which included pre-test scores and group effects, was not statistically significant ($F = 0.579$, $p = .044$, partial $\eta^2 = .018$), indicating that it explained only a small portion of the variance in post-test scores. However, the intercept was highly significant ($F = 64.064$, $p = .000$, partial $\eta^2 = .504$), supporting the hypothesis that the TTA had a significant influence on the LIS of the experimental group. This suggests the intervention had a strong foundational effect on student outcomes. Additionally, the effect of pre-test scores (LIS_Pre) on post-test performance was minor and not statistically significant ($F = 0.250$, $p = .039$, partial $\eta^2 = .004$), indicating that initial skill levels did not substantially affect the intervention's impact. On the other hand, the group comparison was significant ($F = 0.836$, $p = .049$, partial $\eta^2 = .053$), showing that the experimental group achieved greater improvement than the control group. This result affirms the effectiveness of the intervention, with group membership accounting for approximately 5.3% of the variance in post-test scores. The statistical results indicate that the intervention significantly enhanced LIS skills, particularly among those in the experimental group. This aligns with the study's theoretical framework, which integrates Gamification, PBL, and SEL.

Table 4: Descriptive Statistics for the LIS Skills for Both Control and Experimental Groups

Groups	Mean	Std. Deviation	N
Control	4.88	0.500	33
Experimental	5.47	0.425	33
Total	5.12	0.464	66

Table 5: ANCOVA Analysis for the Comparison of Post-Test Scores in LIS Skills for Both Control and Experimental Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	.252 ^a	2	.126	.579	.044	.018
Intercept	13.945	1	13.945	64.064	.000	.504
LIS_Pre	.054	1	.054	.250	.039	.004
Groups	.182	1	.182	.836	.049	.053

a. R Squared = .058 (Adjusted R Squared = -.053)

LIS specifically creativity, critical thinking, collaboration, and communication were developed through gamified project-based learning experiences that required students to apply knowledge in authentic contexts. To foster critical thinking and creativity, for example, students completed tasks such as the Learning Resource Mission, which required them to progress through five levels of activities. This activity guided students to understand the concept of designing instructional materials, create a storyline based on given guidelines, and transform it into a short digital video to be uploaded online. The most viewed and liked video was recognized and rewarded. LIS components were assessed using project rubrics focusing on originality, feasibility, reasoning quality, and evidence-based decision-making. The gamified learning modules encourages engagement and innovation [27]. Course content w

as structured into gamified levels, with points, badges awarded for completing tasks such as brainstorming challenges, and peer feedback rounds [26]. For example, students earned badges for demonstrating innovative ideas or successfully revising projects based on critique.

These interconnected approaches designed to enhance engagement and skill acquisition through contextual learning, interactive, and reflective, which is essential in developing the complex cognitive and emotional competencies in today's dynamic world [44]. The TTA, which combines real-world problem solving, reflective learning, and gamified activities, likely contributed to these outcomes. The significant post-test differences between the experimental and control groups, suggesting that such pedagogical strategies effectively translate theoretical understanding into practical, applicable skills [45], support its emphasis on engaging students in authentic, motivating tasks.

Table 6.: Descriptive Statistics for the Academic Performance of Both Control and Experimental Groups

Groups	Mean	Std. Deviation	N
Control	47.33	10.370	33
Experimental	51.09	10.658	33
Total	49.21	10.604	66

Academic Performance

Table 7: ANCOVA Analysis for the Comparison of Post-Test Scores in Academic Performance of Both Control and Experimental Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	480.869 ^a	2	240.43	2.218	.117	.066
Intercept	2087.05	1	2087.05	19.26	.000	.234
AP_Pre	247.90	1	247.90	2.29	.135	.035
Groups	150.48	1	150.48	1.39	.243	.022

a. R Squared = .066 (Adjusted R Squared = .036)

The ANCOVA results provide important insights into the effectiveness of the TTA in enhancing academic performance.

Although the experimental group, which received a combination of TTA, obtained a higher mean score ($M = 51.09$, $SD = 10.66$) than the control group that received only PBL

($M = 47.33$, $SD = 10.37$), the difference was not statistically significant ($F = 2.218$, $p = .117$, $\eta^2 = .066$). This indicates that the intervention did not account for a substantial portion of the variance in post-test scores, suggesting that other uncontrolled factors may have influenced the results.

While the model as a whole was not significant, the intercept was highly significant ($F = 19.26$, $p = .000$, $\eta^2 = .243$), highlighting a strong overall effect of the TTA implementation. This implies that both groups benefited from

structured, active-learning approaches. The influence of pre-test scores was minimal and marginally non-significant ($F = 2.29$, $p = .135$, $\eta^2 = .035$), which indicates that initial academic ability did not substantially affect post-test outcomes. Similarly, the group effect was not significant ($F = 1.39$, $p = .243$, $\eta^2 = .022$), confirming that the TTA did not produce statistically greater gains compared to PBL alone when initial performance was controlled for. Although the experimental group obtained higher posttest mean scores in academic performance than the control group, the difference was not statistically significant. This suggests that while the TTA effectively enhanced students' learning and innovation skills and social-emotional competencies, its impact on traditional academic outcomes may require further instructional refinement. One possible explanation is that both groups were exposed to PBL, which already promotes

active engagement and conceptual understanding, thereby minimizing measurable differences between instructional conditions. These findings highlight the complexity of educational interventions, particularly when both approaches share core features that foster engagement and problem-solving. Moreover, the demographic profile of participants, primarily young adults in their early twenties and predominantly female may have influenced the outcomes. Prior research indicates that female learners tend to respond positively to interactive and emotionally engaging environments such as PBL and SEL [46], which may help explain the overall academic improvement observed across both groups.

In addition, future implementations of the TTA may strengthen academic outcomes through more explicit alignment between gamified tasks and core content objectives. For instance, embedding direct content mastery checkpoints within gamified levels, integrating discipline-specific formative assessments [47], and extending the duration of intervention across multiple semesters may allow sufficient time for cognitive gains to manifest in standardized achievement measures [48]. Longer exposure periods may also support deeper consolidation of subject knowledge alongside skill development. These adjustments could enhance the academic effectiveness of the TTA while preserving its strengths in promoting holistic competencies.

LIMITATIONS

The findings should be interpreted in light of several limitations. First, the study involved only two intact sections from one institution, with one section assigned to each condition. Consequently, section-level characteristics may be confounded with treatment effects, and individual-level analyses may underestimate clustering. Second, the pooled paired-samples analysis measured overall change across both groups rather than treatment-specific change. Third, LIS and SEL relied partly on self-report measures, which may be affected by social desirability and shared-method variance. Fourth, the predominantly female, early-adult sample limits generalizability.

CONCLUSIONS

In this study, the TTA integrating PBL, LIS, and SEL was explored to bridge the gap between cognitive and emotional learning. Grounded in a holistic theoretical framework, the study aimed to enhance both academic performance and the broader life skills of BTLED students. The central inquiry examined whether this integrated teaching approach could improve outcomes across these domains.

Data analysis revealed a significant positive correlation between LIS and SEL, indicating that strengthening students' creativity and innovation also enhanced their emotional and social competencies [49]. This finding confirms the interdisciplinary nature of the approach, where cognitive and emotional skills interact to foster comprehensive development.

However, the absence of a significant relationship between learning and innovation skills, social-emotional learning, and academic performance may indicate a misalignment between modern competencies and traditional academic assessment

measures. This finding supports calls to broaden evaluation systems to better capture the full range of student abilities beyond conventional achievement tests [50, 51]. The demographic profile of the participants predominantly early adults and largely female may have further influenced the outcomes, particularly in the social-emotional domain where differences in emotional engagement across gender and developmental stages have been documented [52]. While these results underscore the effectiveness of TTA among young adult learners who are generally more receptive to innovative and learner-centered pedagogies, they also limit the generalizability of the findings. Consequently, educational institutions are encouraged to adopt more inclusive and multidimensional assessment frameworks that align with the complex skill demands of the modern workforce and reflect diverse learner profiles [22, 15, 23].

RECOMMENDATIONS

In light of the study's findings, several implications and recommendations can be drawn for educators, curriculum designers, and future researchers. Curriculum designers and teachers are encouraged to integrate gamification, PBL, and SEL into their instructional practices to create more engaging, relevant, and effective learning environments. Embedding these approaches across subjects can promote holistic student development by balancing academic achievement with creativity, collaboration, and emotional intelligence. Teachers are likewise encouraged to apply the TTA to enhance students' innovation, problem-solving, and social-emotional skills while adopting broader assessment tools that capture diverse competencies beyond traditional academic measures. Remember that SEL, LIS, and AP cannot only be nurtured inside the classroom but can also be enhanced through diverse activities outside the classroom [53]. Additionally, further studies may refine and evaluate these integrated approaches through pilot programs and multi-institutional collaborations. Researchers may explore the distinct and combined effects of gamification, PBL, and SEL across various contexts, identify which components most effectively improve outcomes, and investigate how technology can support or enhance these teaching strategies to better prepare students for the demands of modern education and the global workforce. Finally, future studies may examine the impact of the TTA across more diverse student populations, including different age groups, cultural contexts, and socioeconomic backgrounds. Longitudinal research designs are also recommended to investigate sustained academic effects and the long-term transfer of learning and social-emotional competencies into professional practice.

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