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EVALUATING THE EFFECTIVENESS OF A GAMIFIED LEARNING APPROACH IN DIGITAL MARKETING: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

This study aims to evaluate the effectiveness of the educational board game Digital Marketing Tycoon (DMT) in enhancing high school students' understanding of digital marketing concepts. Using a quasi-experimental pretest–posttest design, 345 students from Semarang and Jakarta were divided into an experimental group (n = 177) and a control group (n = 168). The experimental group played DMT for 60–90 minutes, while the control group received conventional instruction. Data were collected through a validated 20-item online quiz (Cronbach's α = .82) administered before and after the intervention. Paired-samples t test revealed a significant improvement in the experimental group (mean increase = 13.94 points), with a large effect size (Cohen's d = 1.55). The control group showed minimal change. A Shapiro–Wilk test confirmed the normality of the data. A strong positive correlation (r = .640, p < .001) indicated consistent learning gains across all ability levels. Qualitative observations indicated increased engagement, collaboration, and strategic thinking. The findings support the integration of purpose-designed board games into entrepreneurship curricula to bridge abstract concepts with real-world application. Recommendations include piloting Digital Marketing Tycoon within national curriculum frameworks, providing teacher training in gamification, and conducting longitudinal studies to assess long-term knowledge retention.

Keywords: quasi-experimental study; pretest–posttest design; educational intervention; gamified learning; digital marketing

INTRODUCTION

Entrepreneurship education in Indonesia increasingly prioritizes digital literacy, given that only 37% of micro, small, and medium enterprises (MSMEs) have integrated into the digital ecosystem (Erlanitasari et al., 2020; Kusuma et al., 2020). Annually, approximately 3.5 million high school graduates choose not to pursue higher education and instead enter the workforce or become MSME entrepreneurs (Badan Pusat Statistik, n.d.). This underscores the importance of equipping high school students with digital marketing knowledge. While entrepreneurship and digital marketing are increasingly taught in schools, within the *Merdeka Belajar–Kampus Merdeka* (MBKM) framework, many high school students continue to struggle with abstract concepts such as click-through rate (CTR), conversion rate, and search engine optimization (SEO) through conventional teaching methods. A preliminary survey conducted across five schools in Jakarta and Semarang (N=120) revealed that 68% of students had difficulty applying digital marketing concepts in real-world contexts, despite understanding their definitions. Based on these findings, this study was conducted to assess students' comprehension of digital marketing concepts, providing a rationale for developing alternative pedagogical approaches.

Gamified learning is a pedagogical strategy that involves designing and integrating game elements into educational settings to enhance student motivation and understanding (Antonaci et al., 2015). Gamification employs components such as competition, challenges, rewards, and narrative elements, transforming learning into an engaging and enjoyable activity (Barzaga & Venadas, 2024). Recent empirical evidence indicates that gamification can enhance learners' motivation, engagement, and conceptual understanding compared to traditional instruction, particularly in business and management education. Large-scale meta-analyses and syntheses have shown that the motivational benefits of gamification are strongest when design elements provide meaningful choices, progressive challenges, immediate feedback, and opportunities for collaboration (Lyons et al., 2023; Majuri et al., 2018).

Gamification has emerged as a widely adopted pedagogical strategy in business and management education, offering ways to increase student engagement, motivation, and knowledge retention (Li et al., 2024; Ratinho & Martins, 2023). In marketing-oriented contexts, simulations and games facilitate the application of abstract concepts such as segmentation, positioning, and budgeting, thereby improving knowledge transfer to practice (Hummel et al., 2021; Lyons et al., 2023). However, meta-analytic findings also reveal limitations: while gamification enhances autonomy and relatedness, its effect on competence is often modest, raising concerns that motivational benefits may not always translate into deeper mastery of content (Li et al., 2024).

Analog game-based learning (GBL), including board and card games, provides students with immersive, interactive, and collaborative environments. Studies show that board games can foster engagement, problem-solving, and decision-making, while simultaneously developing transversal skills such as teamwork and communication (Eckhaus et al., 2017; Mejía, 2024; Sailer & Sailer, 2021). Maratou et al. (2023) highlight that board games are particularly valuable for subjects often perceived as abstract or challenging, such as marketing, by offering tangible anchors for complex ideas. These benefits align closely with constructivist learning principles, which emphasize that students learn best through active participation, reflection, and interaction. Compared with purely digital gamification, the board game format emphasizes dialogue, collaborative problem-solving, and reflective understanding. While marketing concepts are embedded in board game mechanisms (e.g., resource allocation, campaign sequencing, and audience targeting), they provide a concrete foundation for abstract ideas and enable formative assessment through visible, consequence-laden choices (Lyons et al., 2023; Tchokoté & Bawack, 2024).

Unlike traditional lecture-based instruction, game-based learning creates a participatory and stimulating environment that encourages students to revisit concepts, test their understanding, and learn collaboratively. Importantly, even when students designed or evaluated games of varying quality, the process of playing and co-creating games itself produced meaningful learning gains, suggesting that active engagement—rather than game complexity—drives knowledge acquisition.

Recent work in software startup education has demonstrated the value of board games as tools for teaching complex marketing practices such as growth hacking. Kemell et al. (2019) introduced two board games, *Growthopoly* and *The Game of Growth*, designed to familiarize students with key growth hacking techniques ranging from SEO and content marketing to social media strategies. These games provided an engaging entry point into digital marketing by allowing students to experiment with decision-making, resource allocation, and strategy within a simplified rule-based environment. The findings highlight that board games can make abstract and practitioner-driven concepts (such as growth hacking) accessible to students by combining theory with playful interaction. However, the study cautions against risks of oversimplification and "adverse learning," where the mechanics of the game may unintentionally misrepresent real-world dynamics. This recognition aligns with broader concerns in the gamification literature regarding design quality and transferability of learning outcomes. In the context of digital marketing education, such insights support the rationale for Digital Marketing Tycoon (DMT), which uses a structured board game format to introduce complex concepts, while underscoring the importance of critical reflection to ensure students distinguish between gameplay simplifications and real-world marketing practices.

Despite generally positive findings, the literature reports mixed outcomes of gamification. Hanus & Fox (2015) reported declines in intrinsic motivation and satisfaction over time, suggesting that superficial use of points and badges may undermine learning. Skjelbred & Daus (2022) further cautioned that student satisfaction with gamification does not always translate into measurable learning gains. Ratinho & Martins (2023) also noted that motivational boosts may diminish due to novelty effects, particularly when extrinsic rewards overshadow intrinsic engagement. Moreover, individual differences strongly moderate outcomes: Jaskari & Syrjälä (2023) identified varied motivational profiles among marketing students, showing that competitive elements can energize some learners while discouraging others. Hosseini et al. (2022) echoed this, warning that rankings or leaderboards may create anxiety and disengagement among less competitive participants. These conflicting findings stress that the effectiveness of gamification depends on careful design, contextual alignment, and sensitivity to learner diversity (He et al., 2023).

This study has three objectives: (1) to assess the effectiveness of DMT in increasing students' understanding of digital marketing concepts, (2) to analyze the effectiveness of DMT elements—such as strategy, challenges, crisis scenarios, bonuses, and collaborative tasks—in motivating students and improving retention, (3) to evaluate the impact of DMT features (e.g., strategic decision-making cards or crisis-based simulations) in developing 21st-century skills such as collaboration, critical thinking, and decision-making. The practical contributions include providing alternative interactive learning tools, while the policy implications offer a foundation for curriculum-based experiential learning.

RESEARCH METHODS

This study employed a quasi-experimental design with a nonequivalent-group pretest–posttest model. The quasi-experimental method was considered appropriate because it allowed researchers to compare results before and after the intervention without the need to randomly assign participants. This design was chosen due to structural limitations in school class organization, which made randomization neither ethically nor practically feasible. Participants were pre-assigned into two groups by the schools prior to the study, based on existing classroom arrangements.

To minimize selection bias, the experimental and control groups were selected from classes with similar curricular backgrounds, specifically those that had undertaken coursework in entrepreneurship or basic economics. The population comprised senior high school students in Grades X–XII, aged 15–18 years, from Jakarta and Semarang. A total of 345 students (Jakarta: n=182; Semarang: n=163) were selected using purposive sampling based on predefined inclusion criteria: prior enrollment in entrepreneurship or introductory economics courses, and no formal training or work experience in digital marketing. Purposive sampling was employed because class groupings were predetermined by the schools and could not be restructured for experimental purposes.

The study utilized a pretest–posttest design, in which students' knowledge of digital marketing was assessed before and after participation in a game-based learning activity (Yang et al., 2024). This approach enabled the researchers to monitor changes in student performance and evaluate whether the gamified intervention had a measurable impact on learning outcomes (Silitonga et al., 2024).

In this study, the dependent variable was students' understanding of digital marketing concepts, while the independent variable was participation in the Digital Marketing Tycoon (DMT) board game. Students with prior professional experience in digital marketing were excluded to ensure homogeneity in baseline knowledge. The intervention was conducted in a single session lasting 60 to 90 minutes at senior high schools in Jakarta and Semarang between February and March 2025.

Pretest and posttest data were collected through a 20-item multiple-choice online quiz administered via Wayground.com, covering core topics such as branding, search engine optimization (SEO), click-through rate (CTR), and audience engagement. To ensure fairness and reduce potential bias, all assessments were conducted anonymously. Personal identifiers were removed during data analysis to maintain objectivity, and ethical research principles were strictly followed to prevent misconduct. In addition, researchers conducted field observations to document student engagement, peer interactions, and behavioral responses during the gameplay session.

Instrument validation was carried out through a pilot test involving 30 students outside the main sample. To further mitigate selection bias, baseline comparisons were made between the two groups in terms of age, gender distribution, and prior academic performance in relevant subjects. No statistically significant differences were found between the groups on the pretest ($p > .05$), indicating comparable starting levels of knowledge (Morgan et al., 2019).

Data Analysis Techniques

To ensure the validity of inferential testing, assumption checks were performed: the Shapiro–Wilk test confirmed normality ($p > .05$), and Levene's test confirmed homogeneity of variance ($p > .05$).

Group differences were examined using paired-samples *t* tests (pretest vs. posttest within groups) and independent-samples *t* tests (between experimental and control posttest scores). Effect sizes (Cohen's *d*) were also calculated to determine the magnitude of practical impact, complementing statistical significance.

While the quasi-experimental design was appropriate for examining the effectiveness of Digital Marketing Tycoon (DMT) within intact classroom settings, this approach has several limitations. First, the absence of random assignment introduces the risk of selection bias, as preexisting differences between groups (e.g., student motivation, prior knowledge, or classroom environment) may have influenced outcomes beyond the intervention itself. Second, threats to internal validity are more pronounced in quasi-experimental designs, making it difficult to isolate the effect of DMT from other contextual variables such as teacher involvement or peer dynamics. Third, the findings should be interpreted with caution regarding generalizability, since the sample was drawn from specific schools in Semarang and Jakarta, and the intervention lasted only 60–90 minutes. Finally, improvements may have been partially influenced by a Hawthorne effect, whereby students performed better simply due to the novelty and attention associated with the intervention. Acknowledging these limitations align with recommendations in quasi-experimental research (Chen et al., 2022; Martins et al., 2023) and underscores the need for future studies employing randomized or longitudinal designs to validate and extend the findings.

In addition, qualitative data were collected through brief reflective observations and informal student feedback after playing the game to contextualize the quantitative findings. Students reported their perceptions of engagement, enjoyment, and clarity of digital marketing concepts.

RESEARCH FINDINGS

Participant Background Information

Table 1 Demographic Characteristics

Category		Number
Gender	Male	175
	Female	170
Class	Grade X	143
	Grade XI	129
	Grade XII	73
City	Jakarta	163
	Semarang	182

Source: Primary Data

The demographic characteristics of the participants are summarized in Table 1. The sample shows a nearly equal distribution of male (50.72%) and female (49.27%) students. In terms of academic level, participants represented three grade levels: Grade X (41.4%), Grade XI (37.39%), and grade XII (21.15%). Geographically, students came from two cities: Jakarta (52.75%) and Semarang (47.24%). This diversity in gender, grade level, and location suggests that the findings are likely applicable to similar educational settings beyond a single region or type of school.

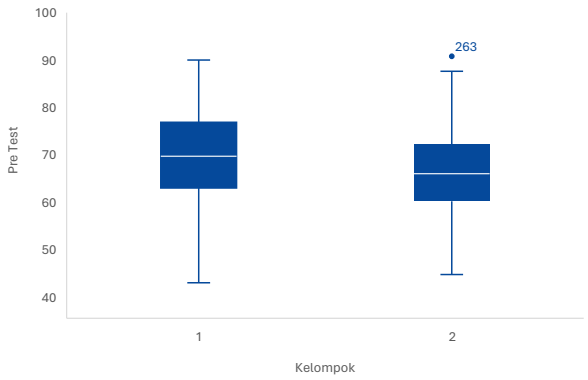

Figure 1 Boxplot of Pretest Results

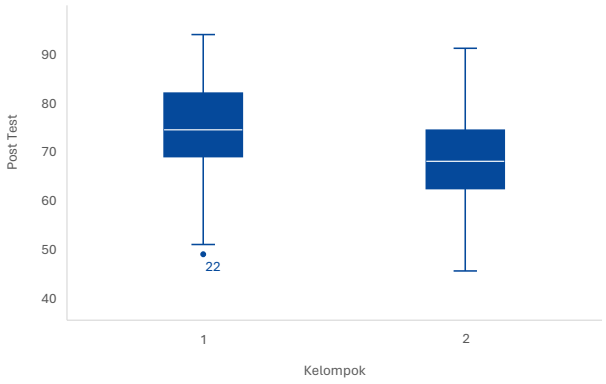

Figure 2 Boxplot of Posttest Results

Source: SPSS Results from Primary Data

Figures 1 and 2 indicate that the experimental group experienced greater learning gains following the intervention compared to the control group.

Table 2 shows the questions and the results of the pretest and posttest for the experimental group. The consistent and significant improvement across nearly all test items indicates that the gamified approach not only enhanced knowledge retention but also facilitated the internalization of key concepts through simulation and experiential learning.

Table 2 Pretest and Posttest Questions with Results of the Experimental Group

No.	Question	Pretest		Posttest		Difference
		Right	Wrong	Right	Wrong	Right
1	What does "CTR" stand for in digital marketing?	65%	35%	76%	24%	11%
2	Which of the following best describes "SEO"?	60%	40%	70%	30%	10%
3	What is the main goal of a landing page?	55%	45%	70%	30%	15%
4	What does "conversion rate" measure?	51%	49%	67%	33%	16%
5	Which platform is used for Search Engine Marketing (SEM)?	56%	44%	70%	30%	14%
6	What is the purpose of a "call-to-action" (CTA) button?	58%	42%	71%	29%	13%
7	What is the function of a caption?	60%	40%	72%	28%	12%
8	What is "bounce rate"?	65%	35%	71%	29%	6%
9	What is the definition of "marketing campaign"?	54%	46%	70%	30%	16%
10	What is the meaning of "customer acquisition cost"?	65%	35%	76%	24%	11%
11	What does "PPC" stand for?	59%	41%	75%	25%	16%
12	What is the meaning of "user-generated content"?	64%	36%	72%	28%	8%
13	What is the role of "customer personas" in marketing?	52%	48%	68%	32%	16%
14	Which of the following best defines "content marketing"?	58%	42%	75%	25%	17%
15	What does "KPI" mean in marketing?	54%	46%	72%	28%	18%
16	What is the definition of a content management system?	55%	45%	71%	29%	16%
17	What is the main purpose of hashtags (#)?	52%	48%	67%	33%	15%
18	What is the definition of email marketing?	57%	43%	72%	28%	15%
19	What is the function of Google Analytics in digital marketing?	51%	49%	69%	31%	18%
20	What is the key characteristic of digital marketing?	55%	45%	70%	30%	15%
	Average	57.35%	42.70%	71.29%	28.80%	13.94%

Source: SPSS Results from Primary Data

Descriptive statistics

Descriptive statistics were used to compare the pretest and posttest scores of the two groups: Group 1 (experimental) and Group 2 (control). The results are summarized in Table 3. On the pretest, Group 1 had a mean score of 57.35 (*SD* = 12.68), while Group 2 achieved a higher mean score of 66.61 (*SD* = 9.77), indicating that the control group entered the study with a relatively stronger foundational understanding. On the posttest, Group 1 showed significant improvement, with the mean increasing to 71.29 (*SD* = 12.03), while Group 2's mean reached 68.36 (*SD* = 9.60).

The distribution of scores across both groups appeared relatively normal, as indicated by skewness and kurtosis values falling within acceptable ranges (±1). The range and interquartile range also suggested some variation in the distribution of scores across time and groups.

Table 3 Descriptive Statistics for Pretest and Posttest Scores by Group

Group	Test	Mean	Std. Dev	Avg	Min.	Max.	Range	Skewness	Kurtosis
Experimental	Pretest	57.35	12.68	57.00	28.0	91.0	63.00	0.180	0.115
Control	Pretest	66.61	9.77	65.94	44.7	93.9	49.15	0.527	0.471
Experimental	Posttest	71.29	12.03	72.00	32.8	99.6	66.80	-0.334	0.510
Control	Posttest	68.36	9.60	67.90	45.5	94.0	48.50	0.415	0.275

Source: SPSS Results from Primary Data

Normality tests were conducted on pretest and posttest scores to ensure that the assumptions of parametric analysis were met. The results of the Shapiro–Wilk tests are presented in Table 4.

Table 4 Normality Test Results

Test	Group	Shapiro–Wilk Sig.
Pretest	Experimental	0.068
Pretest	Control	0.904
Posttest	Experimental	0.102
Posttest	Control	0.962

Source: SPSS Results from Primary Data

The test results show that all pretest and posttest scores were normally distributed ($p > .05$), fulfilling the assumptions required for parametric paired *t*-test. Although the sample size was large ($n > 100$), normality testing was still conducted to ensure the validity of the analysis.

DISCUSSION

Effectiveness of the DMT Board Game

To evaluate the effect of the DMT board game on participants' digital marketing literacy, two statistical analyses were conducted: an independent-samples *t*-test and a paired-samples *t*-test. The independent-samples *t*-test assessed differences in pretest and posttest scores between the control and experimental groups, while the paired-samples *t*-test examined changes in scores within the experimental group before and after the intervention. The findings from these analyses are summarized in the following table.

Table 5 Independent Sample *t*-Test on Pretest Results of Experimental and Control Groups

Variable	Group	*n*	Results	*M*	*SD*	*df*	*t*	*p*
Digital Marketing Literacy	Control	168	Pretest	66.61	9.77	167	-7.568	< .001
	Experimental	177	Pretest	57.35	12.68	176		

Source: SPSS Results from Primary Data

Table 5 presents the pretest scores of participants in the control and experimental groups. Before the intervention, an independent-samples *t*-test showed a statistically significant difference between the two groups. The control group had a higher mean score (M = 66.61, SD = 9.77) compared to the experimental group (M = 57.35, SD = 12.68), with the difference reaching significance (t = -7.568, df = 167, p < .001). This indicates that the digital marketing literacy levels of the two groups were not equal before the intervention.

Table 6 Independent-Samples *t*-Test on Posttest Results of Experimental and Control Groups

Variable	Group	*n*	Test	*M*	*SD*	*df*	*t*	*p*
DMT Intervention	Control	168	Posttest	68.36	9.60	167	2.497	< .001
	Test	177	Posttest	71.29	12.03	176		

Source: SPSS Results from Primary Data

Table 6 displays the posttest results for the control and experimental groups after the implementation of the DMT board game. An independent-samples *t*-test showed a statistically significant difference between the two groups. Participants in the experimental group achieved a higher mean score (M = 71.29, SD = 12.03) compared to the control group (M = 68.36, SD = 9.60), with the difference reaching statistical significance (t = 2.497, df = 167, p < .001). These findings indicate that the DMT intervention had a positive impact on improving digital marketing literacy in the experimental group.

Correlation Between Pretest and Posttest

A strong positive correlation was found between pretest and posttest scores (r = .640, p < .001). This indicates that students who performed well initially tended to perform well after the intervention. More importantly, it suggests that learning gains were consistent across individuals, regardless of their initial ability level (Landau & Everitt, 2003). These findings support the conclusion that board games effectively facilitate learning across diverse ability levels.

Paired-Samples t Test Analysis

A paired-samples *t*-test was conducted to evaluate the effect of the intervention on participants' scores from pretest to posttest within the same group (experimental group, n=177). The results showed that the mean posttest score (M=71.29, SD=12.03) was significantly higher than the mean pretest score (M=57.35, SD=12.68). The correlation between pretest and posttest scores was r = .640, p < .001, indicating a moderate positive relationship between the two measures.

Table 7 Paired-Samples *t*-Test Results

Variables	Group	Results	*M*	*SD*	*df*	*t*	*p*
Pretest and Posttest	Test	Pretest	57.35	12.68	176	-17.7	< .001
		Posttest	71.29	12.03	176		

Source: SPSS Results from Primary Data

The mean difference between pretest and posttest scores was 13.95 with a standard deviation of 10.50. This difference was statistically significant, $t(176) = -17.675$, $p < .001$, with a 95% confidence interval ranging from -15.50 to -12.39. These findings indicate that the intervention had a meaningful and statistically significant impact on improving participants' scores. They suggest that board games have a substantial positive effect on students' understanding of digital marketing concepts (Morgan et al., 2019).

The magnitude of the effect observed in this study is demonstrated by the high *t*-value and narrow confidence interval. This suggests that the impact of board games is not merely a statistical finding but represents a real difference in how students learn (Wellington et al., 1998). The improvements observed across all groups suggest that gamified learning can be a powerful way to help students connect theory with practice, particularly when encouraging teamwork and hands-on engagement (Razali et al., 2020).

Interpretation and Educational Implications

These findings support previous research on the benefits of using games in education, particularly in helping students understand complex ideas and remain motivated (Pittaway & Cope, 2007; Pratikto et al., 2021). In this regard, DMT offers more than entertainment. Its structure encourages students to make strategic choices, solve problems, and receive immediate feedback, all of which contribute to improved learning outcomes (Peterková et al., 2022). Furthermore, the balance between competition and cooperation appears to sustain engagement and enhance retention (Protopsaltis et al., n.d.).

In addition to statistical significance, it is essential to consider the practical significance of the intervention through effect size measures. While *p*-values indicate whether differences are unlikely due to chance, they do not reveal the magnitude of the effect. Cohen's *d* was therefore calculated to estimate the standardized mean difference between pretest and posttest scores. The analysis yielded a Cohen's *d* of 1.55, which, according to Cohen's benchmarks (.20 = small, .50 = medium, .80 = large), represents a very large effect size. This suggests that the DMT intervention produced not only statistically significant but also practically meaningful learning gains, substantially improving students' understanding of digital marketing concepts within a short instructional period.

Although subgroup analyses (e.g., based on gender or geographical location) can sometimes reveal differential responses to educational interventions, such analyses were not conducted in the present study. Preliminary inspection indicated that both male and female students, as well as participants from Jakarta and Semarang, demonstrated similar patterns of improvement. Given the consistent positive trajectory across groups and the focus of this study on evaluating the overall effectiveness of the intervention, subgroup comparisons were considered unnecessary. Nevertheless, future studies could incorporate more fine-grained subgroup analysis or stratified sampling to explore whether demographic or contextual factors moderate the impact of gamified board games in digital marketing education.

How Effective Are Elements of DMT Board Games as a Digital Marketing Learning Tool?

On average, students' scores increased by 13.94 points after playing the game, indicating a significant improvement in their understanding of digital marketing concepts. One of the most impactful aspects of the game was its introduction of key digital marketing terms such as SEM (search engine marketing), CTR (click-through rate), engagement rate, and conversion rate. These concepts were embedded in Strategy, Challenge, Crisis, and Bonus Cards, allowing students to interact with the terminology in real-life business scenarios.

The cards provided opportunities to apply knowledge in realistic situations. For example, Strategy Cards not only tested knowledge but also encouraged students to think critically and make decisions based on marketing principles. This type of active learning deepened understanding and demonstrated how concepts function in practice (Caponetto et al., n.d.). After playing the game, most students could clearly explain these terms and their applications, suggesting that the game facilitated both

vocabulary acquisition and conceptual retention (Gentry et al., 2006). Repeated use of terms in context strengthened learning foundations (Majuri et al., 2018) and made the process of acquiring new terminology feel natural and engaging rather than forced (Nájera-Sánchez et al., 2023).

A notable longitudinal study by Hanus & Fox (2015) examined the impact of gamification—using badges, leaderboards, and point systems—on intrinsic motivation, satisfaction, learner empowerment, and academic performance over a 16-week semester. Contrary to many positive findings, their results showed that while the gamified group initially experienced enthusiasm, over time they demonstrated significantly lower intrinsic motivation, satisfaction, empowerment, and even final exam performance compared to non-gamified counterparts (Hummel et al., 2021). This decline was attributed to reduced novelty and overemphasis on extrinsic reward structures that compromised autonomy, a core component of self-determination theory. For DMT, this suggests caution: game elements should be thoughtfully designed to support autonomy and competence, not merely competition or rewards. While this shorter intervention showed a 13-point gain, the findings of Hanus & Fox (2015) caution that longer-term effects and transfer to exam performance depend heavily on sustaining motivational supports beyond initial engagement.

How Does DMT Affect Student Motivation and Improve Retention?

During the session, many students appeared more engaged and interested in the course material than usual. Their reflections and responses during the game suggest that the competitive yet team-based nature of the activity played a significant role (Sailer & Sailer, 2021). Collecting digital coins, earning engagement, and unlocking customer cards through bonus rewards acted as both internal and external motivators (Wellington et al., 1998). As a result, students became more engaged in the learning process. This aligns with prior research showing that gamification can increase student engagement and help maintain focus over time (Fox et al., 2018; Hanson et al., n.d.).

Recent studies emphasize that gamification is not universally effective; motivational outcomes depend on specific design elements and their alignment with learners' psychological needs. Drawing on self-determination theory (SDT), Sailer et al. (2017) demonstrated that badges, leaderboards, and performance graphs significantly enhanced competence by providing clear and cumulative feedback, while avatars, meaningful stories, and teammates fostered relatedness through shared goals and collaboration. Autonomy, however, was less consistently supported, with weak effects when choice elements were superficially implemented.

This finding is critical for educational board games such as DMT, where mechanics like competition, crisis cards, and collaborative strategy discussions can be deliberately mapped onto the three SDT needs—competence, autonomy, and relatedness—to maximize motivation. Sailer et al. (2017) caution that gamification should not be treated as a uniform construct; poorly designed or weakly integrated elements may fail to generate meaningful engagement. Meta-analyses echo this concern, noting that superficial "points–badges–leaderboards" systems can distract rather than enhance learning. Incorporating these insights, the present study positions DMT as a need-supportive gamified intervention with potential to address motivational deficits often observed in traditional lecture-based digital marketing education.

Recent research continues to refine the understanding of how gamification influences student motivation and learning. A large-scale study reported in *Educational Technology Research and Development* (2023) emphasizes that the effectiveness of gamified learning depends strongly on the alignment between game mechanics and motivational frameworks such as self-determination theory (SDT). The findings show that features such as progressive challenges, timely feedback, and collaborative opportunities are most effective in promoting intrinsic motivation and engagement, whereas superficial design elements often lead only to short-lived or extrinsic motivation.

Importantly, the study highlights that gamification can foster self-regulated learning when students are given meaningful opportunities to exercise autonomy and competence within structured learning environments. These results reinforce arguments that board games such as DMT, which integrate

strategy, crisis management, and collaborative decision-making, can effectively cultivate analytical motivation by satisfying students' needs for autonomy, competence, and relatedness. At the same time, the authors caution that not all gamification designs yield positive outcomes; poor alignment between mechanics and learning goals can result in reduced engagement or even resistance among learners. This dual perspective supports the present study's balanced approach by recognizing both the motivational potential and the limitations of gamified instruction in digital marketing education.

Why Should DMT Board Games Be in the Curriculum?

The results of this study strongly suggest that games like DMT can be a valuable addition to school curricula, especially in subjects such as business, entrepreneurship, and vocational education (Protopsaltis et al., n.d.). Unlike traditional lectures, board games create an environment where students learn by doing, which helps them retain knowledge more effectively and apply it to real-world situations (Newbery et al., 2016).

The experience of working in teams, making strategic choices, and solving problems not only deepens understanding but also builds essential 21st-century skills. These include collaboration, critical thinking, and decision-making, all of which are crucial for future careers in business and beyond (Peterková et al., 2022).

Educators are encouraged to investigate similar gamification tools to make complex topics such as digital marketing easier to understand and more engaging for younger students (Brühlmann, 2018). Integrating such interactive methods into routine learning can inject fresh energy into the classroom and help students connect theory with practice in meaningful ways (Ortiz et al., 2016).

In short, this research shows that carefully designed board games can be more than just fun; they can also serve as a powerful educational tool (Diaz León et al., 2024). Board games not only improve academic achievement but also help students develop important life skills such as teamwork, problem-solving, and strategic thinking (Rahim et al., 2024a). These skills are not only relevant to business and marketing but are also vital for success in today's fast-paced and innovative world (Rahim et al., 2024b).

CONCLUSIONS AND POLICY RECOMMENDATIONS

This mixed-methods study examined the effectiveness of the DMT board game.

First research question: *How effective was DMT in increasing students' understanding of digital marketing terminology?*

The findings highlight several key DMT elements, including Strategy, Challenge, Crisis, and Bonus Card. In-game elements such as Digital Coins, Engagement Cards, Customer Cards, and bonus prizes acted as both internal and external motivators, making the learning experience more dynamic and enjoyable. The DMT board game embeds core digital marketing concepts—branding, copywriting, SEO, customer engagement, and budget management—directly into gameplay. These mechanics align with SDT by fostering autonomy (through strategic decision-making), competence (via feedback and progressive difficulty), and relatedness (through collaboration). Repeated exposure to digital marketing terms in a fun and meaningful context helped students retain and use vocabulary more confidently. Postgame discussions confirmed that interactive reinforcement made it easier for students to connect new terminology with real-world applications. Overall, these findings highlight the value of integrating gamification activities into traditional educational models, particularly in vocational and entrepreneurship education that require hands-on experience.

Second research question: *How effective are elements of DMT board games as a digital marketing learning tool?*

This structured mechanics of DMT—including Strategy, Challenge, Crisis, and Bonus Cards—helped students grasp complex terminology while practicing applied decision-making and problem-solving. Observations confirmed that students were more engaged and motivated, actively collaborating and

reflecting on gameplay. These results support broader evidence that well-designed gamified learning fosters deeper conceptual understanding and engagement in business and marketing education (Kemell et al., 2019; Lyons et al., 2023).

Prior research indicates that gamification can yield both positive and negative outcomes: while it often improves short-term engagement (Sailer et al., 2017), it may reduce motivation or performance over longer periods if elements such as points and leaderboards are poorly aligned with learning goals (Hanus & Fox, 2015). Moreover, cultural and contextual differences matter. Studies in Europe (Kemell et al., 2019) and East Asia (Mejía, 2024) have demonstrated the value of board games for business education but also noted risks of oversimplification or novelty effects. Thus, although the DMT intervention is promising in the Indonesian context, further testing is required before broader generalization.

Third research question: *How does DMT affect student motivation, learning retention, and the development of 21st-century skills?*

DMT incorporates features such as strategic decision-making cards or crisis-based simulations, to develop 21st-century skills like collaboration, communication, creativity, and decision-making. DMT not only supported conceptual learning but also encouraged critical and strategic thinking and practical problem-solving. DMT can be a powerful way to teach challenging digital marketing subjects. This perspective strengthens the rationale for interventions like DMT, which deliberately integrates collaborative strategy-building, crisis management, and reflective learning to satisfy different psychological needs and appeal to heterogeneous student groups.

DMT has the potential to enhance engagement, motivation, and performance across diverse contexts, but its effects depend strongly on design quality and learner characteristics. It contributes to the expansion of research on game-based learning and its integration into formal educational settings. The results further demonstrate the potential of board games to simplify and contextualize complex subjects such as business and marketing for high school students (Almeida, 2017, 2020). This study also provides practical insights for educators seeking innovative and experiential methods to increase classroom engagement, foster teamwork, and enrich pedagogical approaches in entrepreneurship and marketing education (Barzaga & Venadas, 2024).

While this study focused on short-term outcomes, future research should employ longitudinal and randomized controlled designs to examine whether repeated gameplay sustains learning gains over time. Subgroup analyses (e.g., gender, location, prior business background) would help clarify whether particular students benefit more than others. Comparative studies across countries (e.g., Malaysia, the Philippines, or European contexts where marketing board games have been trialed) would also strengthen the evidence base and explore cultural influences on gamified learning. Finally, qualitative approaches such as interviews and classroom observations could complement quantitative results, providing richer insights into how students experience gamification and which elements most effectively drive analytical motivation.

In conclusion, this study affirms that gamified learning tools such as DMT hold significant potential to transform how digital marketing is taught at the secondary level, while emphasizing that their effectiveness depends on thoughtful design, consistent implementation, and policy support. With coordinated action from teachers, schools, policymakers, and industry, gamified board games can move beyond novelty to become sustainable and impactful pedagogical strategies in preparing students for the demands of the digital economy.

The findings provide valuable insights for education policymakers seeking innovative ways to improve curriculum delivery, particularly in business and entrepreneurship education. Given the demonstrated effectiveness of DMT, the Ministry of Education and relevant local education authorities are advised to consider incorporating gamified learning tools into the national curriculum framework for secondary schools. Specifically, integrating board games into business and entrepreneurship courses can help bridge the gap between theory and practice, making abstract concepts more accessible and engaging for students. To ensure successful implementation, teacher professional development programs

should include modules on gamification techniques and their classroom application. This will equip educators with the skills needed to effectively facilitate game-based learning and assess its impact on student performance.

Furthermore, school administrators and curriculum developers are advised to allocate time and resources to pilot board game-based learning in selected schools. These pilots can help monitor student engagement, evaluate learning outcomes, and refine teaching strategies before broader implementation. Policymakers are encouraged to collaborate with educational researchers and game developers to create educational board games that are locally relevant and appropriate for the Indonesian context. Such collaboration will enhance the cultural relevance of learning materials and encourage innovation in teaching methods.

To support long-term sustainability, policy frameworks should formally recognize gamified learning as a valid and effective pedagogical approach. Incentive programs for teachers who adopt creative and interactive teaching methods, including gamification, can encourage wider adoption. Furthermore, partnerships between schools and private-sector stakeholders in digital marketing can enrich the learning experience by offering real-world insights and mentoring opportunities for students.

Although the intervention in this study demonstrated significant short-term improvements in students' understanding of digital marketing concepts, the limited 60–90-minute duration is insufficient to guarantee long-term knowledge retention or sustained behavioral change. To maximize learning impact, it is recommended that the Digital Marketing Tycoon (DMT) board game be integrated into the curriculum on a regular basis rather than as a one-time activity. Specifically, teachers could schedule gameplay on a regular basis (e.g., monthly), allowing students to revisit key concepts, reflect on past decisions, and progressively build deeper analytical skills. Embedding the game into a recurring learning cycle ensures that digital marketing terminology, strategies, and problem-solving practices remain fresh and are reinforced over time.

From a practical standpoint, educators are advised to incorporate DMT sessions into their teaching plans, aligning them with specific topics in the digital marketing syllabus. This guidance provides a feasible framework for sustained game use but also empowers teachers to sustain student engagement, foster collaborative learning, and cultivate 21st-century skills such as critical thinking, decision-making, and teamwork.

In summary, this study highlights the transformative potential of gamified learning through DMT to enhance student understanding, motivation, and engagement. With appropriate policy and institutional support, board game-based learning can become an essential part of a modern, learner-centered education system, preparing students for future challenges in the digital economy.

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