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THE EFFECT OF GAMIFICATION AS AN INTERVENTION IN THE COLLEGE OF CRIMINOLOGY JUSTICE (CCJ) ON STUDENTS' ACADEMIC PERFORMANCE IN WRITING A RESEARCH PAPER

Ma. Purificacion Mayor Gannaban
Institute of Integrated Development Education, Pamantasan ng Lungsod ng Muntinlupa, Muntinlupa City, Philippines
e-mail:gannabanmaria@plmun.edu.ph

Abstract: This study examines the effect of gamification as an instructional intervention on the academic performance of students at the College of Criminology Justice (CCJ) in writing a research paper. Given the growing need for innovative and engaging teaching approaches among 21st-century learners, gamification offers opportunities to enhance students' motivation, participation, and learning experiences. The study employed a quantitative quasi-experimental research design involving two groups: a control group that received regular instruction and an experimental group that participated in gamified learning activities. Pre-test and post-test assessments were used to evaluate students' knowledge and academic performance in research paper writing.

The findings indicate a statistically significant difference between the groups, with the experimental group demonstrating a higher mean score. The results suggest that gamification can positively contribute to students' academic performance and engagement in research writing activities. The study also highlights improvements reported in students' motivation, timely submission of assignments, and the quality of their research papers. Further studies involving multiple teachers and larger student groups are recommended to explore the effectiveness of gamification in academic writing.

Keywords: gamification, rewards, academic writing, innovative teaching methods, intervention, academic performance.

Introduction

Students in the 21st century are increasingly oriented towards technology, making it more challenging for teachers to capture and maintain their interest. Motivating learners to remain focused on their lessons requires additional effort, which teachers may sometimes find demanding and time-consuming. Lesson preparation, for instance, needs to be innovative enough to encourage students to listen, participate, and become actively involved in the learning process. However, not all teaching approaches are equally effective for the diverse needs and abilities of today's learners.

Twenty-first-century learners are expected to think creatively, collaborate effectively, and apply innovation in their everyday lives (NEA, 2012; Partnership for 21st Century Skills, 2009). Therefore, they need creative learning materials and instructional approaches that can stimulate their interest and motivation. Rich (2010) describes 21st-century skills as core competencies that include collaboration, digital literacy, critical thinking, and problem-solving. These competencies are considered essential for helping students succeed in the contemporary world. These competencies are considered essential for helping students succeed in the contemporary world [9; 10; 13].

Today's learners are often described as digital natives because of their extensive exposure to technology. They are familiar with digital environments and are increasingly required to develop critical-thinking and problem-solving abilities. In this context, the importance of metacognition should be emphasized. Saavedra and Opfer (2012), in their discussion of the principles for teaching 21st-century skills and competencies, highlight the importance of teaching learners how to learn. This approach encourages students to become independent learners who can participate in collaborative activities, develop higher-order thinking skills, and take responsibility for their learning.

Consequently, innovative instructional materials and methods are needed to empower and motivate students [14, pp. 8–9].

Various innovative instructional materials and methodologies are being introduced in educational settings, each offering potential benefits depending on learners' needs. These approaches include flipped classrooms, project-based learning, cooperative learning, gamification, problem-based learning, design thinking, thinking-based learning, and competency-based learning. Although these methods offer different opportunities for improving teaching and learning, selecting the most appropriate approach depends on students' learning abilities, interests, and motivation [9; 10].

One way to motivate learners is through rewards and recognition. Among the instructional approaches that incorporate these elements is gamification. It involves using game-based elements in educational activities, including rewards for achieving goals and penalties for failing to meet established requirements. According to Kapp (2012), gamification involves the use of game mechanics, aesthetics, and game thinking to engage people, motivate action, promote learning, and solve problems. In education, these elements can encourage students' motivation, engagement, and participation [18, pp. 9–10].

Lee and Hammer (2011) discuss the use of gamification in education by addressing what gamification is, why it may be useful, and how it can be implemented. They consider its techniques, potential advantages and disadvantages, current applications, and possible future developments. Their work highlights the importance of designing interventions that are appropriate to students' needs [5, p. 146].

Integrating games into teaching and learning is an innovative approach that may make educational activities more engaging. Dichev and Dicheva (2017) describe educational gamification as an emerging approach to increasing learners' motivation and engagement through the incorporation of game-design elements into educational environments. In this context, learning objectives can be organized into specific goals or quests, while rewards or badges can recognize students' achievements [1, pp. 1–2].

Mee Mee et al. (2020) examined the role of gamification in classroom teaching and highlighted its potential contribution to the development of learners' creative, critical-thinking, and problem-solving skills. They also discussed how interesting and engaging activities may support students' language learning [8, pp. 684–686].

Although various studies have examined the application of games and gamification in education, the use of gamified activities in teaching academic writing at the tertiary level deserves further investigation. Research paper writing is often perceived by students as a demanding and time-consuming task. Therefore, this study explores the application of gamification to make the process more engaging and to examine its relationship with the academic performance of students in the College of Criminology and Criminal Justice.

Objectives

The study aimed to achieve the following objectives:

1. To assess the impact of gamification on the academic performance of CCJ students.
2. To examine the influence of gamification on the research paper writing process among CCJ students.
3. To determine the significant relationship between academic performance and research paper writing through the use of a gamification intervention among CCJ students.

Research Materials and Methods

This section presents the research design, respondents, research instruments, procedures, data collection process, and statistical methods used to analyze the findings.

Research Design

The study employed a quantitative quasi-experimental research design to examine the effect of gamification techniques on research paper writing among college students enrolled in the Criminology and Criminal Justice Program at Pamantasan ng Lungsod ng Muntinlupa.

The researcher established two groups: a control group that did not participate in gamified activities and an experimental group that experienced gamification techniques while preparing their academic research papers.

Respondents

The participants were students enrolled in the Criminology and Criminal Justice Program at Pamantasan ng Lungsod ng Muntinlupa, particularly those taking the Purposive Communication course taught by the researcher. Most of the students were first-year students. Sections at the institution generally consisted of 50–60 students. However, participation in the study was voluntary, and approximately 30–35 students completed both the pre-test and post-test.

To maintain consistency, the researcher aimed to include at least 30 participants from each section. The participants were divided into two groups: an experimental group and a control group. Group assignment was based on pre-test scores. Students with the lowest scores were assigned to the experimental group, while those with higher scores were assigned to the control group.

Convenience sampling was used to select participants based on their accessibility and willingness to participate voluntarily. This approach was considered practical given the circumstances and limitations of the study.

The experimental group participated in gamified activities described in a manual developed by the researcher. Approval to conduct the study was obtained from the researcher's dean, with the condition that students were informed about the study and given the opportunity to decide whether to participate.

Research Instrument

Two tests, a pre-test and a post-test, were used to assess students' learning during the study. The test consisted of 50 conceptual questions designed to measure students' understanding of the different components of research paper writing, from formulating a research title to developing an appropriate conclusion.

Procedure

The Gamification Manual developed for the Purposive Communication course in the Criminology and Criminal Justice Program at Pamantasan ng Lungsod ng Muntinlupa was designed to make academic writing more engaging and enjoyable for students.

The manual introduced gamified activities inspired by popular games to enhance students' motivation and participation in research paper writing. Students were divided into teams and selected hero avatars. They earned points, including Health Points (HP) and Mana Points (MP), by completing quests related to different stages of research paper preparation.

These quests included selecting a research topic, preparing a bibliography, developing the research paper, and defending the completed work. Each quest had specific criteria for earning points, and students were required to meet established deadlines to avoid point deductions.

The manual also provided guidelines for implementing the activities, including rules for team formation, scoring, and penalties for missed tasks or misconduct. Through this gamified approach, the researcher aimed to motivate students, support the development of their writing skills, and foster a greater appreciation of academic research.

Data Collection

Participants completed a pre-test to assess their knowledge of the different approaches to writing a research paper. Following the pre-test, they were selected and assigned to the respective groups.

Data collection took place in November 2022, at the beginning of the final quarter of the first semester. The final data collection was conducted during the final examination week, when students were expected to submit their research papers as their final course output.

Data Analysis

The raw scores collected through Google Forms were exported to the Statistical Package for the Social Sciences (SPSS) for analysis. Descriptive statistics were used to summarize and organize the data.

A univariate repeated-measures analysis of variance was employed to examine differences between the pre-test and post-test results of the control and experimental groups. Levene's test was used to assess the homogeneity of variance assumption.

Research Results

The purpose of this study was to determine the effect of gamification as an instructional intervention on the academic performance of students in research paper writing at the College of Criminology and Criminal Justice, Pamantasan ng Lungsod ng Muntinlupa. This section presents the analysis and interpretation of the findings based on the statistical procedures used in the study. The tables provide descriptive and inferential statistical information concerning the relationship between gamification and students' academic performance in research paper writing.

Descriptive Statistics

Table 1. Descriptive Statistics of the Control and Treatment Groups

Group	Mean	Std. Deviation	Sample Size
Controlled Group	2.70	5.11	30
Treatment Group	8.47	3.73	30
Total	5.58	5.30	60

The descriptive statistics in Table 1 show the reported performance of the control and treatment groups. The treatment group obtained a higher mean score (8.47) than the control group (2.70). The standard deviation of the treatment group (3.73) was lower than that of the control group (5.11), indicating less variability in the reported scores among students in the treatment group.

These descriptive results show a difference between the two groups. However, the table does not specify whether the reported means represent pre-test scores, post-test scores, or another measurement. Therefore, the values should not be interpreted independently as evidence of improvement from pre-test to post-test.

Previous studies have suggested that gamification can support student engagement, motivation, and learning. Dichev and Dicheva (2017), for example, discussed the potential of gamification to influence learners' motivation and engagement in educational settings. The findings of the present study are considered in relation to this body of research.

Levene's Test of Equality of Error Variances

Table 2: Levene's Test of Equality of Error Variances

F	df1	df2	Sig.
2.23	1	58	14

Note: The significance value is reproduced as reported in the original table and should be checked against the original SPSS output.

Levene's test is used to examine whether the error variances of the dependent variable are equal across groups. The original interpretation of the results states that the significance value is higher than .05, indicating that the assumption of homogeneity of variance is satisfied.

If the intended significance value is .14, the result would indicate that the difference in variances is not statistically significant at the .05 level. However, the value is presented as "14" in the original table. It is therefore necessary to verify the exact value using the original statistical output before drawing a definitive conclusion.

Tests of Between-Subjects Effects

Table 3. Tests of Between-Subjects Effects of the Control and Experimental Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	498.817	1	498.817	24.94	.000	.301
Intercept	1870.417	1	1870.417	93.54	.000	—
Group	498.817	1	498.817	24.94	.000	.301
Error	1159.767	58	19.996	—	—	—
Total	3529.000	60	—	—	—	—
Corrected Total	1658.583	59	—	—	—	—

Note: A significance value displayed as .000 in statistical software is conventionally reported as $p < .001$.

Table 3 presents the between-subjects effects for the control and experimental groups, calculated using Type III sums of squares. The results indicate a statistically significant group effect, $F(1, 58) = 24.94$, $p < .001$. The partial eta squared value was .301, indicating that the group factor accounted for 30.1% of the corrected variance in the dependent variable within the reported model.

The findings demonstrate a statistically significant difference between the control and experimental groups in the reported academic performance scores. The result is consistent with the study's objective of examining the relationship between gamification and students' academic performance.

However, the group assignment was based on pre-test scores, with students obtaining lower scores assigned to the experimental group and those with higher scores assigned to the control group. This should be considered when interpreting the findings, as initial differences between groups may have influenced the results.

The findings are discussed in relation to previous research on gamification and student engagement. The Self-Determination Theory of Deci and Ryan (1985) emphasizes the importance of autonomy, competence, and relatedness in motivation. Similarly, Bandura's (1986) Social Cognitive Theory highlights the role of observational learning and reinforcement in shaping human behavior. These theoretical perspectives provide a basis for discussing how game-based activities may support students' participation and learning.

Conclusion and Recommendations

The study examined the use of gamification as an instructional intervention in research paper writing among students of the College of Criminology and Criminal Justice at Pamantasan ng Lungsod ng Muntinlupa.

The reported findings indicate a statistically significant difference between the control and experimental groups in academic performance. The experimental group obtained a higher mean score than the control group. The results of the analysis of variance also showed a significant group effect, with a partial eta squared of .301.

The researcher reports that students who participated in gamified activities demonstrated greater engagement in the learning tasks and were more motivated to complete the different stages of research paper writing. The gamified activities were also associated with more timely submissions and improvements in the quality of students' research papers, as described in the original study.

These findings suggest that gamification may be a useful instructional approach for organizing academic writing activities and encouraging student participation. Nevertheless, the interpretation of the results should take into account the quasi-experimental design and the assignment of students to groups based on pre-test scores. Further research should provide separate pre-test and post-test

descriptive statistics and clearly defined measures of research-paper quality, motivation, and engagement.

The study recommends further investigation of gamification in educational settings, including its implementation by multiple instructors. Such research may provide a broader understanding of how gamified instructional activities can be incorporated into academic writing and other areas of higher education.

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REFERENCES

1. Dichev, C., & Dicheva, D. (2017). Gamifying education: What is known, what is believed and what remains uncertain: A critical review. International Journal of Educational Technology in Higher Education, 14(1), 1–36. https://doi.org/10.1186/s41239-017-0042-5

2. Jackson, M. (2016). Gamification elements to use for learning. Retrieved October 27, 2022, from https://trainingindustry.com/content/uploads/2017/07/enspire_cs_gamification_2016.pdf

3. Kelly, M. (2021, September 7). Pretests. ThoughtCo. https://www.thoughtco.com/importance-and-uses-of-pretests-7674

4. Kiryakova, G., Angelova, N., & Yordanova, L. (2014). Gamification in education. [Publication details were not provided in the original reference.]

5. Lee, J. J., & Hammer, J. (2011). Gamification in education: What, how, why bother? Academic Exchange Quarterly, 15(2).

6. Lim, S. P., Wong, Y. V., Woo, A., & Rao, Y. S. (2020). Role of gamification in classroom teaching: Pre-service teachers' view. International Journal of Evaluation and Research in Education, 9(3), 684–690.

7. Locke, E. A., & Latham, G. P. (2015). Breaking the rules. Advances in Motivation Science, 99–126. https://doi.org/10.1016/bs.adms.2015.05.001

8. Mee Mee, R., Tengku Shahdan, T., Ismail, M. R., Ghani, K., Lim, S. P., Wong, Y., & Rao, Y. (2020). Role of gamification in classroom teaching: Pre-service teachers' view. International Journal of Evaluation and Research in Education, 9(3), 684–690. https://doi.org/10.11591/ijere.v9i3.20622

9. National Education Association. (2012). Preparing 21st century students for a global society: An educator's guide to the Four Cs. Retrieved October 25, 2022, from http://www.nea.org/assets/docs/A-Guide-to-Four-Cs.pdf

10. Partnership for 21st Century Skills. (2009). A framework for 21st century learning. http://www.p21.org/

11. Qurotul Aini et al. (2019). [Article details as provided in the original reference]. International Journal of Advanced Trends in Computer Science and Engineering, 8(1.5), 269–274. http://www.warse.org/IJATCSE/static/pdf/file/ijatcse4781.52019.pdf

12. Ryan, D. (2022). 5 ways gamification can improve learning. Retrieved October 24, 2022, from https://www.softwareadvice.com/resources/benefits-of-gamification-in-education/

13. Rich. (2010). How do you define 21st-century learning? Education Week. Retrieved October 25, 2022, from https://www.edweek.org/teaching-learning/how-do-you-define-21st-century-learning/2010/10

14. Saavedra, A., & Opfer, V. D. (2012). Learning 21st-century skills requires 21st-century teaching. The Phi Delta Kappan, 94, 8–13. https://doi.org/10.2307/41763587

15. Schunk, D. H., & DiBenedetto, M. K. (2019). Motivation and social cognitive theory. Contemporary Educational Psychology. https://doi.org/10.1016/j.cedpsych.2019.101832

16. Scientific Educational Journal. (2018). Volume 6, Issue 1. Kioulanis, S. “Teaching trends and challenges in contemporary learning environments: The secret of fire.” [Further publication details were not provided in the original reference.]

17. Wiggins, G., & McTighe, J. (2011). The understanding by design guide to creating high-quality units.

КРИМИНОЛОГИЯ ЖӘНЕ ҚЫЛМЫСТЫҚ ӘДІЛЕТ КОЛЛЕДЖІНДЕ (CCJ) ИНТЕРВЕНЦИЯ РЕТІНДЕ ГЕЙМИФИКАЦИЯНЫ ҚОЛДАНУДЫҢ СТУДЕНТТЕРДІҢ ҒЫЛЫМИ ЖҰМЫС ЖАЗУДАҒЫ АКАДЕМИЯЛЫҚ ҮЛГЕРІМІНЕ ӘСЕРІ

Ма. Пурификасьон Майор Ганнабан
Интеграцияланған даму білім беру институты, Мунтинлупа қалалық университеті,
Мунтинлупа қаласы, Филиппин.
e-mail: gannabanmaria@plmun.edu.ph

Аңдатпа: Бұл зерттеу Криминология және қылмыстық әділет колледжінде (CCJ) студенттердің ғылыми жұмыс жазудағы академиялық үлгеріміне оқыту интервенциясы ретінде геймификацияны қолданудың әсерін қарастырады. XXI ғасыр студенттерінің ерекшеліктерін ескере отырып, оқыту үдерісіне инновациялық әрі қызықты әдістерді енгізу олардың оқу мотивациясы мен белсенділігін арттырудың маңызды шарты болып табылады. Зерттеу сандық квазиэкспериментік дизайн негізінде жүргізілді.

Зерттеуге екі топ қатысты: дәстүрлі оқыту әдістерін қолданған бақылау тобы және геймификация элементтері енгізілген эксперименттік топ. Студенттердің ғылыми жұмыс жазу бойынша білімдері мен академиялық үлгерімін бағалау үшін алдын ала және қорытынды тестілеу жүргізілді. Нәтижелер топтар арасында статистикалық тұрғыдан маңызды айырмашылық бар екенін және эксперименттік топтың орташа көрсеткіші жоғары болғанын көрсетті.

Зерттеу нәтижелері геймификацияны қолдану студенттердің академиялық үлгеріміне, оқу үдерісіне қатысу белсенділігіне және мотивациясына оң ықпал етуі мүмкін екенін көрсетеді. Сонымен қатар тапсырмаларды уақытылы орындау мен ғылыми жұмыстардың сапасын арттыруға ықпал ететіні атап өтіледі. Болашақта геймификацияның тиімділігін тереңірек зерттеу үшін бірнеше оқытушы мен студенттердің кеңірек тобын қамтитын зерттеулер жүргізу ұсынылады.

Түйін сөздер: геймификация, марапаттау, академиялық жазылым, инновациялық оқыту әдістері, интервенция, академиялық үлгерім.

ВЛИЯНИЕ ГЕЙМИФИКАЦИИ КАК ИНТЕРВЕНЦИИ В КОЛЛЕДЖЕ КРИМИНОЛОГИИ И УГОЛОВНОГО ПРАВОСУДИЯ (CCJ) НА АКАДЕМИЧЕСКУЮ УСПЕВАЕМОСТЬ СТУДЕНТОВ ПРИ НАПИСАНИИ НАУЧНОЙ РАБОТЫ

Ма. Пурификасьон Майор Ганнабан
Институт интегрированного развития образования, Городской университет Мунтинлупы, город Мунтинлупа, Филиппины.
e-mail: gannabanmaria@plmun.edu.ph

Аннотация: В данном исследовании рассматривается влияние геймификации как образовательной интервенции на академическую успеваемость студентов Колледжа криминологии и уголовного правосудия (CCJ) при написании научной работы. Учитывая особенности студентов XXI века, внедрение инновационных и интерактивных методов обучения приобретает особое значение для повышения учебной мотивации и вовлечённости обучающихся. Исследование проводилось с использованием количественного квазиэкспериментального дизайна и включало две группы: контрольную группу, обучавшуюся с применением традиционных методов, и экспериментальную группу, участвовавшую в учебных мероприятиях с элементами геймификации.

Для оценки знаний и академической успеваемости студентов в написании научной работы были проведены предварительное и итоговое тестирования. Результаты показали статистически значимые различия между группами, при этом средний показатель экспериментальной группы оказался выше. Полученные данные свидетельствуют о том, что применение геймификации может положительно влиять на академическую успеваемость, учебную активность и мотивацию студентов. Также отмечается её возможное положительное влияние на своевременное выполнение заданий и качество научных работ.

Рекомендуется проведение дальнейших исследований с участием нескольких преподавателей и более широких групп студентов для углублённого изучения эффективности геймификации в академическом письме.

Ключевые слова: геймификация, вознаграждение, академическое письмо, инновационные методы обучения, интервенция, академическая успеваемость.