EMPOWERING ACADEMIC WRITING IN EDUCATION 5.0 ERA: THE EFFICACY OF HYBRID PROJECT-BASED LEARNING

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Abstract

Within the current educational environment, characterized by the principles of personalized learning and technological integration known as Education 5.0, we conduct an academic inquiry into the effectiveness of hybrid project-based learning (HPBL) approaches in enhancing students' academic writing skills. By implementing a rigorous quasi-experimental design, we conscientiously gathered data from a population of 113 pupils that was selected using cluster random sampling techniques. By employing independent t-tests by the SPSS program for Windows, we compared the writing performance of 30 students in the experimental HPBL group with that of 28 students assigned to the control group. The results showed statistical differences in both academic writing abilities. The results of this study emphasize the importance of HPBL in providing students with the diverse skills and abilities necessary to navigate the intricate challenges of Education 5.0.

Keywords – Academic writing, Education 5.0, Hybrid project-based learning

Introduction

The Education 5.0 paradigm signifies a paradigmatic change in contemporary education by significantly emphasizing technology integration and personalized learning. It addresses the demand for flexible educational frameworks in the age of Society 5.0 and the hyper-intelligent community. Educational cyborgization using technology for personalized instruction(Zielińska, 2021); flexible and individualized learning trajectories facilitated by teachers who act as mentors in Economy 5.0; student-centered learning with an emphasis on cognitive comprehension in Community 5.0; and Digital Language Teaching 5.0, which implements digital pedagogies and Industry 5.0 technologies in English language education (Meniado, 2023), are fundamental elements of this paradigm. This paradigm requires novel methodologies to give students the requisite competencies for a world undergoing swift transformations.

Academic writing is crucial for student achievement in the quickly changing Education 5.0 era. Writing is a vital academic skill and essential competency in today's knowledge-based culture. It serves as a means of communication that promotes comprehension and enhances communication skills (Leon, 2023). To become proficient in academic writing,

one must acquire metalinguistic, communicative, and discourse competencies by logically arranging and organizing information (Kochubei, 2021). Aside from academics, it develops abilities that may be applied in professional settings (West et al., 2019). It is crucial for management success since clear writing, editing, and particular procedures improve written communication efficacy (Holley, 2023). Developing academic writing skills during education is essential for future professional success and efficient communication in different fields.

Educators are facing a growing challenge to create new and effective teaching methods that engage students and enhance their skills in academic writing in the context of Education 5.0. As students engage with Education 5.0, they must express concepts adequately, combine knowledge, and communicate findings effectively. Traditional teaching techniques frequently do not effectively develop these crucial skills, so it is necessary to investigate new and captivating approaches.

This study examines the prospective effectiveness of hybrid project-based learning (HPBL) in improving students' academic writing skills. Hybrid Project-Based Learning (PBL) is a novel pedagogical strategy that effectively merges the advantageous aspects of project-based learning and hybrid learning. By combining in-person and online components, hybrid learning enables a blended mode of instruction that improves adaptability, student engagement, and learning outcomes (Bozkurt, 2022; Bozkurt, A. & Sharma, R. C., 2022; Rasheed et al., 2020; Vallée et al., 2020) Simultaneously, project-based learning fosters computational thinking, practical knowledge application, and proactive investigation (Usher & Barak, 2020; Wu & Wu, 2020). The effectiveness of this student-centered approach in cultivating motivation, academic achievement, and higher-order thinking skills has been demonstrated(Kuo et al., 2019; Sasson et al., 2018)

Integrating hybrid learning and project-based learning results in a dynamic and immersive learning environment that utilizes the qualities of both methods. HPBL utilizes virtual platforms and collaborative projects to provide a flexible and engaging framework for developing critical thinking, creativity, and communication skills in academic writing (Anazifa & Djukri, 2017; Gunawan et al., 2017; Rochmahwati, 2015). HPBL shows potential for improving students' academic writing skills in language acquisition and communication-focused fields.

This research examines the efficacy of Hybrid Project-Based Learning (HPBL) in fostering students' academic writing abilities. Through integrating the positive aspects of hybrid and project-based learning approaches, HPBL aims to provide an all-encompassing and captivating scholastic journey. The research holds considerable importance due to its potential to provide insights into educational practices, specifically within the dynamic framework of Education 5.0. Through an examination of the effectiveness of HPBL, this research exhibits the potential to stimulate the implementation of novel pedagogical approaches. Implementing these strategies is of the utmost importance to provide students with the diverse abilities required to succeed in modern educational settings. Furthermore, this study aims to fill a significant void in the current body of knowledge by performing an exhaustive assessment of the influence of HPBL on the development of academic writing abilities. Although prior research has investigated the merits of project-based learning and hybrid learning environments in isolation, there is a scarcity of studies that specifically analyze the synergistic consequences of integrating these methodologies in academic writing instruction.

This study seeks to investigate the effectiveness of Hybrid Project-Based Learning (HPBL) in improving students' academic writing proficiency by examining the research question, "Does HPBL result in any significant disparity in academic writing outcomes between students instructed in HPBL and those instructed in conventional project-based learning?" This research seeks to contribute to the educational community and aid in making informed decisions about instructional methodologies by providing empirical evidence and insights into the comparative efficacy of various pedagogical approaches.

Literature Review

Education 5.0

Within the framework of Society 5.0, an initiative that seeks to improve human well-being and tackle societal issues through seamlessly integrating the physical and digital domains, Education 5.0 arises as an indispensable element. Education 5.0 transcends the ordinary transmission of knowledge by emphasizing value creation, the encouragement of creativity, and the adjustment to Industry 4.0's requirements. The educational approach acknowledges the importance of fostering scholastic aptitude and the capacity for inventive thinking and resolving intricate challenges (Nikum, 2022).

Education 5.0 follows the overarching goals of Society 5.0: to attain competitiveness, inclusivity, and sustainability by employing intelligent application of knowledge (Salgues, 2018). Utilizing technology to create individualized, adaptable learning environments is a crucial approach known as "education cyborgization" (Zielińska, 2021). Contrary to the unrestrained and uncertain nature of Revolution 5.0(Vitanova, 2023). Education 5.0 aims to integrate cyberspace and physical spaces comprehensively to offer learning opportunities that transcend boundaries and are readily available to all(Deguchi et al., 2020). However, to address the challenges of the Society 5.0 era, Education 5.0 must be implemented with educators possessing enhanced digital competencies(Supa'at & Ihsan, 2023).

Embracing Education 5.0's mentality in higher education is vital for preparing students for Society 5.0, focusing on methodologies, success, and well-being to nurture change-driving professionals (Pinheiro & Santos, 2023). Digital pedagogy fostering critical thinking, adaptability, and social intelligence through tech skills is central (Murtiningsih et al., 2023). Hybrid project-based learning (PBL) follows Education 5.0, combining offline and online modalities with real-world projects to cultivate practical skills such as problem-solving, critical thinking, and collaboration.

Engaging authentic hybrid PBL challenges allows applying theory meaningfully with digital collaborations, embodying Education 5.0's emphasis on value creation, creativity, and adaptability for the digital age. Hybrid PBL pushes students to apply theoretical concepts in real-world circumstances, using digital technology to engage with peers and access varied resources outside the classroom. Thus, hybrid PBL embodies Education 5.0's emphasis on value creation, creativity, and flexibility, preparing students for the digital age and social growth.

Hybrid Project-Based Learning

Hybrid project-based learning, founded upon the constructivist educational philosophy, signifies the integration of two influential pedagogical approaches: project-based learning and hybrid learning. By integrating the most advantageous aspects of technological progress in education, this novel methodology surpasses the constraints of conventional and exclusively virtual pedagogical techniques (Broadbent, 2017). Using technology, hybrid project-

based learning democratizes education by providing rural students access to classroom instruction. In addition, it facilitates interactive digital and in-person exchanges between instructors and learners while enhancing the effectiveness of online transactions and reducing time restrictions(Gil et al., 2022). In addition to increasing adaptability (Bozkurt, A. & Sharma, R. C., 2022), this dual interaction model improves learning outcomes(Rasheed et al., 2020; Vallée et al., 2020), thereby accommodating the characteristics of a wide range of learners(Linder, 2017).

Project-based learning is an essential element of hybrid project-based learning. It is an educational methodology that enables pupils to recognize practical issues and obstacles, formulate effective solutions, and collaborate on their development (Bender, 2012; Krajcik & Shin, 2014). This approach fosters student engagement and motivation (Asfihana et al., 2022), sense of value and acceptability among students (Rochmahwati et al., 2024), the development of critical and creative thinking (Anazifa & Djukri, 2017; Rochmahwati, 2015), innovative problem-solving capabilities (Mursid et al., 2021). Using project-based learning, students transform from passive recipients of knowledge to active contributors in constructing their comprehension of intricate concepts (Kuo et al., 2019). Through this experiential learning methodology, students are equipped with the knowledge and skills to confront real-life dilemmas' intricacies with assurance and competence.

Academic Writing

Writing is a complex cognitive and linguistic ability. It is fundamental in language education, especially in English as a Foreign Language (EFL) settings (McKinley, 2022). The importance of English writing skills has increased during globalization and technological progress, leading to in-depth research in psychology, teaching methods, and linguistics to improve EFL and ESL writing education. Academic writing plays a crucial role in student achievement in higher education, as highlighted by various research (Husin & Nurbayani, 2017).

Academic writing is essential for English-medium college and university students as it helps them develop the necessary abilities to write essays and other scholarly tasks following recognized style and referencing guidelines. English writing proficiency has gained significance in the current era of technological advancement and globalization, leading to in-depth research in psychology, pedagogy, and linguistics on EFL and ESL writing instruction to enhance understanding and effectiveness (Bui et al., 2023; Nation & Macalister, 2020)

Methodology

Using a quasi-experimental design, this study examined the effects of manipulating an independent variable analogous to experimental research (Creswell, 2023). The experimental group received Hybrid Project-Based Learning (HPBL) instruction, which adhered to a structured methodology derived from prior scholarly works. Six phases of HPBL were implemented throughout a fourteen-week intervention period. In contrast, the control group participated in traditional Project-Based Learning (PBL) throughout the identical period.

Students in the HPBL group participated in various exercises designed to improve their academic writing abilities. After engaging in theoretical readings that emphasized the development of critical thinking abilities, they participated in a webinar on academic writing. The students then developed the project design plan, regularly incorporating instructors' and peers' feedback. The culmination stage entailed the dissemination of scholarly articles. On the contrary, the control group underwent conventional PBL, which

placed greater emphasis on face-to-face interactions and made restricted utilization of technology. In the classroom, scaffolding technologies were integrated, and students were required to utilize paper-based essay formats instead of digital platforms. The dissemination and construction of ultimate deliverables took place in the confines of the classroom, emphasizing direct engagement between students.

The research comprised a sample size of 113 students, of which 30 were randomly allocated to the experimental group, and 28 were assigned to the control group using cluster random sampling. By employing this approach, a comparative analysis was conducted to determine whether Hybrid Project-Based Learning (HPBL) or traditional Project-Based Learning (PBL) improved students' academic writing abilities. A series of inquiries was incorporated into the examination to assess writing abilities, emphasizing argumentative essays. The evaluations were examined utilizing a writing scoring rubric modified by Weigle (2002). This rubric incorporated construct validity, grounded in writing theories, and content validity, ensuring the measured aspects were relevant. The performance was assessed using a rubric of four distinct levels: Excellent, Needs Improvement, and Well-Developed. The criteria for each level included thesis clarity, content development, organization, sentence flow, and grammatical accuracy (Weigle, 2002). The process of data analysis for this investigation was conducted in multiple phases. At the outset, descriptive statistics offered a concise overview of the gathered data. Then, hypothesis testing took place, employing an independent t-test for parametric testing. By employing this methodical approach, an exhaustive analysis was possible regarding the comparative efficacy of HPBL and traditional PBL in cultivating students' academic writing abilities.

Finding and Discussion

This section will present the post-test results administered to the experimental and control groups. Its purpose was to evaluate the efficacy of Hybrid Project-Based Learning (HPBL) compared to traditional Project-Based Learning (PBL) regarding enhancing students' academic writing abilities. By conducting hypothesis testing and utilizing the independent t-test as a parametric testing method in particular, the collected data will be meticulously examined to determine whether there are any statistically significant differences between the two groups. Moreover, this segment shall partake in an exhaustive discourse,

Table 1. The result of the post-test for the Experimental and Control Group

The descriptive statistics provide crucial insights into the study's participants' academic writing outcomes. The mean score for the cohort participating in Hybrid Project-Based Learning (HPBL) was 68.60. The range of scores observed was from 60.00 to 82.00, with a standard deviation of 5.48729. On the other hand, the cohort that received traditional Project-Based Learning (PBL) demonstrated a marginally diminished average score of 63.8571, with a range of 56.00 to 72.00 and a standard deviation of 3.60775. The provided statistics present a numerical depiction of the variability and distribution of academic writing performance among the various groups. Significantly, the HPBL group exhibits a broader range of scores and a higher mean score than the PBL group. This finding implies that students exposed to hybrid project-based learning might have a more extensive variation in their writing proficiency. Additional examination and testing of hypotheses will clarify whether the

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Dev
Hybrid PBL	30	60.00	82.00	68.6000	5.48729
PBL	28	56.00	72.00	63.8571	3.60775
Valid N (listwise)	**28**				

differences that have been observed are statistically significant and have ramifications for the effectiveness of various pedagogical methods in improving the academic writing abilities of students.

Table 2. The result of the Hypothesis Test

Independent Samples Test						
		Levene's Test		t-test for Equality of Means		
		F	Sig.	t	df	Sig.
HPBL-PBL_ Academic Writing	Equal variances assumed	3.120	.083	3.860	56	.000
	Equal variances are not assumed.			3.914	50.458	.000

The independent samples t-test results show significant differences in academic writing scores between the Hybrid Project-Based Learning (HPBL) and traditional Project-Based Learning (PBL) groups. The Levene's test was performed to check for equal variances. The test showed a non-significant result ($F = 3.120$, $p = .083$), confirming that the assumption of equal variances was satisfied. A t-test was performed to compare means, assuming equal variances. The results showed a significant difference between the two groups ($t(56) = 3.860$, $p < .001$). The average variance in academic writing scores between the HPBL and PBL groups was 4.74286, with a standard deviation of 1.22880. The 95% confidence interval for the difference was 2.28127 to 7.20445, showing that the mean academic writing score for the HPBL group was substantially more significant than that of the PBL group. Furthermore, in cases when identical variances were not assumed, the findings were consistent, showing a statistically significant distinction between the groups ($t(50.458) = 3.914$, $p < .001$). The results highlight that HPBL is more effective than standard PBL in developing advanced academic writing skills, offering helpful information for educators and policymakers.

Consistent with prior research that emphasizes the beneficial impacts of hybrid learning and project-based learning on students' writing proficiency(Aghayani & Hajmohammadi, 2019; Hakimah, 2023; Roohani & Shafiee Rad, 2022; Turmudi, 2020)

This study's results provide robust evidence in favor of the proposed hypothesis. Through the seamless integration of writing into projects directed by students, HPBL establishes a structured and genuine inquiry framework that promotes the growth and improvement of advanced writing abilities. Students are expected to progress through a series of phases: organizing, generating, revising, and editing (Brown & Lee, 2015). This process empowers them to communicate concepts, ideas, and evidence effectively. The aforementioned iterative procedure is in stark contrast to the methodology employed by scholars when constructing significance (Williams, 2023). Moreover, it fosters the development of critical thinking, problem-solving, and communication proficiencies indispensable for achievement in scholarly and vocational environments.

HPBL closely follows the ideas of Education 5.0, an innovative educational approach that focuses on customized learning and the integration of technology(Sajidan et al., 2020; Sułkowski et al., 2021). Education 5.0 aims to prepare students with the essential abilities needed for success in a fast-evolving environment by promoting creative methods in response to the needs of Society 5.0 and the brilliant society (Meniado, 2023; Zielińska, 2021)

Hybrid project-based learning enhances writing abilities by combining digital technology, collaborative platforms, individualized learning experiences, and multimodal materials, offering advantages over traditional project-based learning. Hybrid learning combines the strengths of

traditional and online teaching methods to leverage educational technology improvements and provide classroom instruction to students in rural locations (Broadbent, 2017). It reduces the duration of online transactions, improves in-person and digital interactions between teachers and students, provides adaptability, boosts learning results, and accommodates different types of learners. Project-based learning, an instructional method that promotes real-world problem-solving, has been shown to enhance engaged participation, motivation, innovative problem-solving, critical thinking, and collaboration skills (Anazifa & Djukri, 2017; Bender, 2012; Krajcik & Shin, 2014; Kuo et al., 2019; Mursid et al., 2021; Usher & Barak, 2020). HPBL combines these two methods to create a genuine and organized investigative structure that promotes the development of sophisticated writing abilities.

In summary, Hybrid Project-Based Learning (HPBL) closely corresponds to the tenets of Education 5.0 by utilizing collaborative platforms, digital technologies, and personalized learning strategies to improve students' proficiency in academic writing. Through cultivating critical thinking, problem-solving, collaboration, and communication proficiencies, HPBL effectively equips pupils with the necessary tools and knowledge to thrive in scholarly and occupational environments, thus conforming to the aims of Education 5.0. It is recommended that educators and policymakers contemplate adopting HPBL as a pedagogical strategy in order to furnish students with the essential proficiencies and abilities required to prosper in the swiftly changing educational environment.

Conclusion

The results indicated notable statistical difference in academic writing capabilities, emphasizing the efficacy of Hybrid Project-Based Learning (HPBL) in cultivating advanced writing skills crucial for students to successfully navigate the intricacies of Education 5.0, in contrast to traditional Project-Based Learning (PBL). Nevertheless, it is critical to recognize the specific constraints of this research. The research's scope was limited to a specific educational environment, which could impede the applicability of its results to more extensive populations or contexts. Notwithstanding this constraint, the research holds importance due to its capacity to provide insights into educational methodologies and contribute to the continuous dialogue concerning inventive pedagogical approaches in the age of Education 5.0. Subsequent investigations may delve deeper into the enduring consequences of integrating HPBL, scrutinize potential moderators or mediators of its influence on writing proficiency, and assess its feasibility in various educational settings. By delving into these domains of investigation, policymakers and educators can further improve pedagogical methodologies and enhance students' readiness for accomplishment in the ever-evolving realm of Education 5.0.

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