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Inclusive Education and the Use of Assistive Technologies: A Systematic Review

Maria Heredia-Solorzano¹, Jhonny Villafuerte-Holguín²

¹ Programa de Maestría en Educación Mención Innovación Educativa, Universidad Laica Eloy Alfaro de Manabí, Ecuador. Email: maria.heredia@pg.ulead.edu.ec, <https://orcid.org/0009-0004-4378-0155> /

² Research project: Innovaciones pedagógicas e internacionalización de la formación de docentes para el desarrollo humano y sostenible. Grupo de investigación Innovaciones Pedagógicas para el Desarrollo Sostenible, Universidad Laica Eloy Alfaro de Manabí. Email: Jhonny.villafuerte@uleam.edu.ec <https://orcid.org/0000-0001-6053-6307>

Abstract

The increase in the frequency and quality of educational technology use is notable. However, studies are needed to analyze scientific production regarding the use of assistive technologies in inclusive education in Latin America. This work aims to contribute to the consolidation of educational innovations for students with visual impairments by reviewing scientific publications that address assistive technology. This study uses hermeneutics and bibliometrics to identify contributions to assistive technology. The PRISMA methodology was used to select the corpus. Eighty-six scientific articles published in English or Spanish between 2015 and 2025 and available in the Scopus, Web of Science, and Scielo databases were reviewed. The review concludes that screen readers, Braille, artificial intelligence, and augmented reality are the most commonly used assistive technologies for students with visual impairments.

Keywords: Innovation, Teachers, Disability, Educational Technology

1. Introduction

Inclusive education seeks to guarantee access, participation, and learning for all students, regardless of their individual, cultural, or social circumstances. Achieving this requires innovations in teaching practices, as they are a key factor that will enhance its effectiveness (Tovar, 2015).

Authors such as Robles et al. (2018) and Salazar and Mesa (2019) agree that digital accessibility in educational platforms guarantees adaptive and barrier-free learning environments. However, challenges persist in the quality of education and in the provision of adequate resources for students with visual impairments (Ocampo, 2018). In this regard, Alonso and Villafuerte-Holguín (2020) argue that there is a clear need for greater teacher training on strategies for promoting socio-educational inclusion and the implementation of curricular adaptations, but that the provision of technical and institutional support is also important. Alcaraz and Arnaiz (2020) mention that 83.2% of students with Special Educational Needs (SEN) are enrolled in mainstream classrooms, with an increase in

special units and a reduction in cases of multiple disabilities in Spain. For their part, Valdés et al. (2023) state that inclusion in mainstream classrooms reached 70% coverage since 2017, as a result of the School Integration Program implemented in public schools in Chile. In the case of Ecuador, statistics report that 78% of children and young people with disabilities between the ages of 3 and 17 attend the mainstream education system, demonstrating a notable growth in the student population requiring inclusive education. Consequently, it is necessary to have research that addresses the niche related to the identification of assistive technology resources that have achieved relevant results in serving students with visual disabilities globally. To this end, the authors of this paper use hermeneutics and bibliometrics to identify scientific articles that address the topic of inclusive technology with an emphasis on working with students with visual impairments.

Using the PRISMA methodology, 86 scientific articles published in English or Spanish between 2015 and 2025 and available in the Scopus, Web of Science, and Scielo databases were selected. The terms used to conduct the literature search were: access, education, educational innovation, Ibero-America, educational inclusion, assistive technology, and educational technology. The selected publications were analyzed based on the following categories: (1) inclusive education and teaching practices, (2) Visual Impairment, and (3) Assistive technology.

The research questions guiding this research are:

1. What are the advances and challenges of inclusive education?
2. How are students with visual impairments served?
3. What is the contribution of assistive technologies to the educational process of students with visual impairments?

This research aims to contribute to the consolidation of educational innovations for students with visual impairments by reviewing scientific publications addressing assistive technology in the period 2015-2025.

2. Development

2.1. Inclusive Education and Teaching Practices

Teaching practices in inclusive education play a fundamental role, but the lack of training and institutional support limits their contribution (Villafuerte and Carreño, 2015). Thus, Castillo (2015) emphasizes the importance of comprehensive and humane academic preparation that enables teachers to address an increasingly complex and diverse educational reality. Victoriano (2017) emphasizes the need to work on selecting pedagogical strategies that contribute to improving coexistence in schools and help overcome communication barriers, while Sevilla et al. (2018) demonstrate that strengthening teaching competencies is necessary to advance toward inclusive and committed education that addresses the diversity of students and their families.

The work of researchers Huenul et al. (2016) and Carrasco (2018) agree that teaching practices face barriers such as a lack of accessible materials, adapted technology, and adequate infrastructure. The works of Hernández and Torres (2018), Rojas et al. (2018), Santa Cruz et al. (2021), and Gómez (2018) concur that teaching practices are more relevant when serving children and young people with visual impairments who report levels of stress and anxiety due to accessibility barriers and a lack of adapted methodologies. Meanwhile, Del Rio et al. (2018), Jimenez and Mesa (2020), and Bravo et al. (2021) confirm that physical and social barriers persist in educational centers and that these must be overcome to achieve full educational inclusion. Furthermore, collaboration between the school, the family, and the community will enable the success of inclusive education (Barrionuevo, 2020). For their part, Villafuerte and Cevallos (2021) state that leadership is a vital factor that must be strengthened in teaching practice as it enhances the management of educational centers. Furthermore, schools must transform their policies and capacities to successfully address interdisciplinarity in inclusive education (Párraga et al., 2021). Furthermore, Espinosa et al. (2021) propose a model of educational inclusion based on the experiences of students with disabilities, highlighting the contribution of internal and external attitudinal and social support.

However, the effectiveness of inclusive practices is not entirely complete since teacher training, which is a key factor in promoting adaptive learning, remains limited from the teachers' perspective (Lozano et al., 2021). For their part, Monge et al. (2021) determined that inclusion in higher education in Costa Rica is perceived as a moral

imperative, but requires greater investment. In this context, policies and laws promoting social and educational inclusion are essential to overcome the identified weaknesses. Thus, Palmeros and Gairín (2016) and Pérez (2023) compared public policies developed in Mexico and Spain, determining that, although there has been progress in the regulations of both countries, their scope is limited due to a lack of resources and teacher training. In the university context, Ayala et al. (2023) confirm that inclusive education in Ecuadorian universities is not effectively implemented due to a lack of training and participation of its stakeholders, while Pérez (2023) identifies that the barriers that persist in higher education are pedagogical, physical, access to information, and attitudinal. Santillan and Villafuerte (2023) also concur, stating that the lack of infrastructure and training limits access to and development of teaching practices aimed at serving students with sensory, physical, or intellectual disabilities. While Delgado and Ponce (2023) point to neuroeducation as a possible solution because it promotes attention, motivation, and socio-emotional support, facilitating the integration of all students, including those with specific educational needs.

According to Ruiz (2024), there is a persistent absence of inclusive policies that strengthen teaching practices in the university classroom. At the same time, Rodríguez and García (2024) mention that public policies should be reviewed to improve social and educational inclusion by enhancing accessibility to friendlier educational environments, without this representing an additional burden on teaching practice. While Vargas et al. (2024) emphasize that students perceive serious deficiencies in the inclusive process, especially in public education institutions, and highlight the urgent need to improve teachers' skills and knowledge for the management of inclusive education. Finally, Balta et al. (2024) emphasize the urgency of promoting an inclusive culture that values diversity in the university educational environment and provides the resources required to enhance teaching practices in the context of higher education.

2.2. Visual Deficit and Impairment

For a better understanding of the fundamental concepts addressed in this research, it is indicated that the term visual deficit refers to a reduction in vision, while visual impairment refers to a more severe impairment (Lorenzo, 2017). According to Coneo (2019) and López and Vásquez (2022), visual impairment negatively affects academic performance, hindering text review, participation, and language development. Likewise, Cortés and Salas (2019) mention that visual impairment occurs when this condition significantly affects people's daily lives, preventing them from performing essential tasks without specialized support.

To address the challenges associated with visual impairment, it is essential to implement inclusion strategies and adaptations that enable equitable learning. This is supported by Parra and Peñas (2015) when they state that the counseling and emotional support provided through support and mentoring groups help students with visual impairments overcome social and emotional challenges. Angenscheidt and Navarrete (2017) and Duck et al. (2019) add that it is essential to train educators on inclusive practices and the use of adapted resources for serving students with visual impairments. Navarro et al. (2016) and Cruz et al. (2023) agree that teaching materials, methodologies, and technological tools in curricula need to be adapted.

Worldwide, 36 million people were blind in 2015, and 216.6 million had moderate to severe visual impairment, representing a 17.6% increase in blindness since 1990 due to population growth and aging (Rupert et al., 2017). Research conducted in Spain shows that the most common visual disorders are myopic maculopathy and ocular trauma (Menéndez and Castell, 2020). The World Health Organization (2019) states that visual impairment can be classified into four levels: mild, moderate, severe, and total blindness. This depends on visual acuity and the loss a person achieves in their visual field. According to Montoya and López (2022), visual impairment hinders learning and the development of cognitive and socioemotional skills in students of various ages. Consequently, it has a direct and negative influence on academic performance (Palma and Ponce, 2023). Meanwhile, the World Health Organization (2021) estimates that millions of people with visual impairments represent a challenge for inclusive education.

Visual impairment affects academic performance by making it difficult to acquire information in visually dependent educational environments. This is confirmed by Escudero and Castro (2023), who demonstrate that

students with visual impairments face difficulties in reading, writing, and comprehension, exacerbated by the lack of adequate adaptations in the classroom. Therefore, visual impairment represents a significant challenge in the educational field, affecting both the learning process and the social integration of students who suffer from it. Therefore, Freire et al. (2024) state that this disability severely limits vision and cannot be fully corrected with glasses, surgery, or medical treatment. This condition ranges from a moderate reduction in vision to total blindness. According to the World Health Organization (2021), visual impairment is classified as low vision, which reports visual acuity between 6/18 and 3/60; and blindness, which has visual acuity less than 3/60 or a visual field less than 10 degrees.

2.3. Assistive Technology and Educational Processes

The implementation of assistive technology in educational settings has been shown to have a positive impact on the academic performance of students with visual impairments. In this regard, Beltrán et al. (2015) argue that it is essential to implement inclusion strategies and methodologies, such as assistive technologies and Braille teaching materials, to facilitate access to information for students with visual impairments.

Despite the benefits provided by assistive technology, students and their caregivers face a barrier to accessing these tools due to their high cost. Furthermore, the lack of adequate training among teaching staff on the use and integration of these assistive technologies can reduce their effectiveness. Pascuas (2015) indicates that only 35% of the teachers surveyed feel competent in using these tools to serve students with visual impairments. For his part, Viscaíno (2018) found that electronic Braille devices, which are part of assistive technology, can facilitate the learning of mathematics and science, traditionally challenging areas for these students. Pinoargote-Vera et al. (2018) affirm that the use of WhatsApp is considered a support tool for teaching students with visual impairments. On the other hand, Mogollon et al. (2019) indicate that collaboration between educational institutions, governments, and the community is essential to access and implement technological resources in educational centers.

Clavijo and Bautista (2020) explain that to strengthen educational inclusion in higher education institutions, it is essential to instruct faculty in the use of technological resources and incorporate actions aimed at improving the approach to diversity in all professional training programs. Furthermore, Bell (2020) points out that universities lack the tools and training to manage inclusion, which impedes the use of relevant intervention strategies. However, Yépez and Castillo (2020) state that despite the actions taken to raise awareness among members of Higher Education Institutions, student dissatisfaction persists due to the lack of attention to diversity. According to Hidalgo and Larco (2021), the actions of these institutions can lead to confusion between inclusion and regulatory compliance; therefore, progress in social justice, equity, and inclusion in universities is still weak.

Villafuerte and Pinoargote (2020) state that the use of computer applications in the context of university education can support students with progressive visual impairment in completing their tasks and socializing, increasing opportunities to achieve greater autonomy and improve academic performance. Furthermore, Oviedo et al. (2021), Sánchez and Sabando (2021) agree that mobility and orientation training allows students with visual impairments to develop safe mobility skills and achieve greater autonomy. These skills, combined with the use of assistive technology, enhance users' comprehension.

Assistive technology has emerged as an essential tool to facilitate learning for students with visual impairments in educational settings. Pérez and Reeves (2023) emphasize that assistive technologies are products or systems that enhance the capabilities of people with disabilities, facilitating equitable access to the educational curriculum. For Sánchez et al. (2024), assistive tools for visual impairments include traditional optical devices and digital solutions such as screen readers and electronic Braille. Therefore, Rivas (2024) implemented the use of screen readers and voice recognition software, significantly improving reading comprehension and written production in students with low vision. However, maximizing the benefits of assistive technology in the education of students with visual impairments requires the implementation of comprehensive strategies that address the aforementioned challenges. This confirms that ongoing teacher training in assistive technologies and collaboration between institutions and

families are key to improving inclusive education. Furthermore, inclusive policies urgently need to fund these technologies, as they are essential to ensuring equity in access to learning (Sánchez et al., 2024).

3. Methodology

This bibliometric study uses the PRISMA method (Page et al., 2021) to ensure rigor in the corpus selection process.

The selection criteria used are:

Type of documents: Scientific articles published in indexed journals.

Languages: Spanish and English.

Analysis period: 2015-2025

Databases consulted: Scopus, Web of Science, and Scielo.

Inclusion criteria: Exclusion criteria

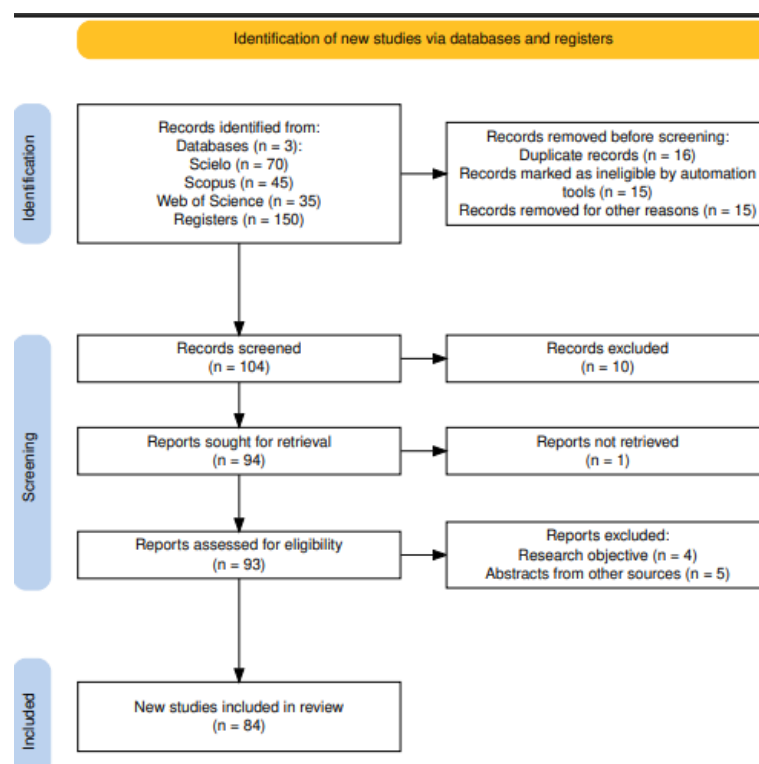
Studies that address the use of assistive technologies in inclusive education. Documents that do not directly address educational inclusion.

Research focused on students with visual impairments. Opinion articles or reviews without data analysis.

Publications focused on educational innovation. Repeated studies or studies without full-text access.

3.1. Corpus Selection Procedure

1. Search the Scopus, Web of Science, and Scielo databases using the keywords inclusive education, assistive technologies, visual impairment, and educational accessibility.
2. Initially, 240 articles were selected, and after applying the inclusion and exclusion criteria, 86 scientific publications were obtained.
3. Publication patterns, most cited authors, journals with the highest impact, and trends in the use of assistive technologies were examined.
4. The publications were analyzed based on the research questions. Figure 1 shows the PRISMA diagram showing the corpus selection process.



3.2. Bibliometric Analysis Procedure

It identifies the main trends in scientific production on inclusive education and assistive technologies for students with visual impairments, applying indicators of scientific productivity, impact, and academic collaboration.

Scientific Productivity and Temporal Distribution

A progressive increase in publications on inclusive education and assistive technologies was identified during the period 2015-2025. Among the most relevant findings:

The 54% of the articles were published between 2020 and 2025, and 46% were published between 2015 and 2019, reflecting a growth in academic interest in the topic, especially given the impact of the COVID-19 pandemic on education.

Journals with the Highest Impact

The main journals that published research on assistive technologies and inclusive education were: *Revista Latinoamericana de Educación Inclusiva*, *Educación y Educadores*, *Revista Electrónica de Tecnología Educativa*, *International Journal of Inclusive Education*, and *Journal of Assistive Technologies*. These publications are characterized by their high impact in the educational and technological fields.

Most Relevant Authors and Affiliations

Recurring authors on the topic were identified, with a notable concentration of researchers from: Mexico (6%); Colombia (8%); Spain (10%); Chile (10%); and Ecuador (25%). The universities with the highest scientific output in this field were: Universidad Autónoma de Barcelona (Spain); Universidad Nacional Autónoma de México (UNAM); and Pontifical Catholic University of Chile. Twenty-five percent of the articles analyzed were published by Ecuadorian researchers affiliated with Universidad Laica Eloy Alfaro de Manabí in Ecuador, evidence that indicates that country's growing participation in the discussion on inclusive education and technological accessibility. Predominant Thematic Areas

Through keyword and abstract analysis, the most recurrent themes in the scientific output were identified: Use of assistive technologies in inclusive education (55%); Pedagogical and technological barriers for students with visual impairments (30%); Strategies for implementing ICTs in special education (15%). The use of specialized software such as screen readers (JAWS and NVDA), digital Braille materials, and artificial intelligence applications for accessibility were some of the most prominent topics in the publications.

Impact and Citations

□ 40% of the articles analyzed have more than 20 citations in Scopus or Web of Science, indicating their relevance in the scientific community.

□ The studies with the greatest impact focus on the implementation of accessible digital platforms, the use of artificial intelligence in inclusive education, and the adoption of technological devices for people with visual impairments.

4. Discussion

The bibliometric analysis shows growth in scientific production on inclusive education and assistive technologies, especially in the last five years. The highest-impact journals and the most cited authors come from Ecuador, Spain, Mexico, Chile, and Colombia.

4.1. The advances and challenges of inclusive education

In Latin American nations, educational inclusion and the use of assistive technology have made significant progress, but face similar challenges. Thus, in Mexico and Chile, enrollment rates for students with disabilities have increased, but barriers to access and educational quality persist (Aquino et al., 2015; Valdés et al., 2023). In Ecuador, 78% of children and young people with disabilities attend the education system, albeit with deficiencies

in resources and adaptations (Ocampo, 2018). These findings highlight the need to strengthen inclusive policies toward these goals. Among the advances, progressive legislation stands out in each nation. For example, Ecuador's 2008 Constitution guarantees equitable access to education (UNESCO, 2023). Authors such as Basantes et al. (2018), Viscaíno (2018), and Rivas (2024) agree that the use of assistive technologies has improved the inclusion of students with disabilities. However, authors such as Villafuerte and Carreño (2015) and Rodríguez and García (2024) confirm that the challenges include a persistent lack of teacher training in inclusive methodologies and insufficient access to resources for curricular adaptation, creating a gap in the educational context. Furthermore, structural, pedagogical, and attitudinal barriers that hinder the full inclusion of students with visual impairments persist. According to Palmeros and Gairín (2016), the lack of training in attention to diversity limits the effective application of inclusive strategies. Likewise, Victoriano (2017) identifies that discriminatory attitudes within the classroom affect the retention of students with disabilities. It is added that authors such as Anquino et al. (2015), Fajardo (2017), Fernández et al. (2015), Llamazares et al. (2017), maintain that problems persist that urgently need to be overcome. Thus, Aquino et al. (2015) state that barriers to inclusive education are related to accessibility, the development of assistive technology, and limited teacher training. Fernández et al. (2015) argue that the lack of specific strategies for working with students with visual impairments demonstrates a notable gap in educational accessibility, while Fajardo (2017) argues for the urgency of establishing regulations to guarantee access to educational resources and adaptations that favor the inclusion of students with visual impairments. These barriers are compounded by structural problems, such as the shortage of accessible materials and physical adaptations in educational institutions (Monge et al., 2021).

4.2. Care for students with visual impairment

Research by Pérez et al. (2015) and Ibáñez et al. (2017) concurs that visual impairment affects quality of life, requiring adaptation strategies and specialized resources to promote inclusion and autonomy. Meza (2018) asserts that visual impairment can lead to academic failure if appropriate learning strategies are not implemented. Furthermore, visual impairment affects the ability to perceive and process information, making it difficult to perform daily activities (Cruz et al., 2019). Likewise, Cáceres et al. (2019) mention that visual impairment poses educational challenges, affecting students' communication, social interaction, and emotional development. This deficit persists as a prevalent condition in the student population, with significant impacts on learning and social integration (Montoya and López, 2022). The lack of accessible materials and adaptive methodologies continues to be a recurring problem in educational institutions (Huenul et al., 2016). Furthermore, there is evidence of a lack of curricular adaptations for students with this condition, which impacts reading comprehension and participation in academic activities (Coneo, 2019; López and Vásquez, 2022). The socio-emotional development of students with visual impairments is also affected. Research suggests that these students experience higher levels of anxiety and depression due to the lack of effective inclusion strategies (Santa Cruz et al., 2021). Furthermore, teachers require specific training on accessible teaching materials and adaptive methodologies (Lozano et al., 2021), highlighting the need to strengthen teacher training in inclusive education.

4.3. Contribution of Assistive Technologies to the Educational Process of Students with Visual Impairments

Beltrán et al. (2015) argue that the use of assistive technologies, such as screen readers and Braille materials, improves student autonomy. Llamazares et al. (2017) argue that tiflotechnology promotes the autonomy of individuals with visual impairments. Furthermore, Basantes et al. (2018) assert that technological tools enhance students' access to the information required for their studies, which improves their functional capacities. These tools are essential for overcoming barriers in school environments (Esparza et al., 2018), where collaboration between educational institutions, governments, and specialized organizations is key to optimizing their implementation (Mogollón et al., 2019). Núñez and López (2020) argue that assistive technology and adapted methodologies enhance inclusive learning for students with visual impairments. Thus, the use of JAWS and NVDA applications facilitates data reading and improves learning conditions (Zamora and Marín, 2021). At the same time, artificial intelligence, augmented reality, and adaptive platforms improve visual acuity, but their use faces challenges due to a lack of resources and educational policies (Acho et al., 2021; Torres, 2024).

This is a fundamental resource in inclusive education, generating positive impacts on access to information and learning for students with visual impairments (Pérez and Reeves, 2023). Tools such as electronic Braille displays, screen readers, and touchscreens have improved reading comprehension and written production (Viscaíno, 2018; Rivas, 2024; Alonso and Villafuerte, 2020). Their application has enabled the development of more equitable and participatory methodologies (Sánchez et al., 2024). However, other studies question the effectiveness of these strategies, arguing that they have not significantly improved the academic performance of students with visual impairments (Sánchez & Sabando, 2021). Furthermore, access to these tools remains unequal, especially in institutions with financial limitations (García Rivas, 2024), and the training of teaching staff in the use of assistive technology remains a weakness that must be overcome to ensure its effectiveness (Torres, 2024). In the case of Ecuador, García Rivas (2024) indicates that Ecuadorian educators value assistive technology but face challenges related to connectivity, access to devices, and teacher training.

Within the framework of research, the need to design teacher training strategies that integrate adaptive teaching approaches and the use of assistive technologies as support tools for effective inclusion arises. The proposal is to design training programs that incorporate inclusive methodologies in initial teacher training, as well as to establish educational policies that promote universal accessibility in the education system. The consolidation of an inclusive culture in educational institutions must be based on collaboration between teachers, students, families, and administrations, ensuring an equitable and accessible learning environment for all.

5. Conclusion

Based on a systematic review of the specialized literature, the authors declare full compliance with the objective proposed for this study: to contribute to the consolidation of educational innovations for the care of students with visual impairments through a review of scientific publications addressing assistive technology during the period 2015-2025. The data presented reflect the most recent state of scientific production on inclusive education and the use of assistive technologies for students with visual impairments. It is concluded that inclusive education in Latin America has made significant progress in terms of regulations and the implementation of assistive technologies. However, structural, pedagogical, and attitudinal barriers persist that require urgent attention. Teacher training, the provision of accessible resources, and the formulation of effective inclusive policies are key strategies to ensure truly equitable, high-quality education for all students, regardless of their abilities. The research findings highlight the relevance of incorporating assistive technologies in the curricular design of inclusive education, the need to ensure availability for students with visual impairments and have teacher training strategies in the use and application of inclusive digital tools. For future studies, the following lines of research are proposed: (1) incorporation of adapted teaching materials and the use of specialized software for the attention of students with visual impairments, (2) measurement of the impact of curricular adaptations on the academic and socio-emotional performance of students with visual impairments. Based on the above, this research shows a systematic analysis of scientific publications that integrates visual deficit and assistive technology, contributing to the development of inclusive education in Ecuador.

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Effect of the Pyramid Program Weight Training on the Muscular Strength of Swimmers at Yulin Sports School, Guangxi Province, China

Liang Yujun¹, Singha Tulyakul²

¹ Student at the Master of Education Program in Physical Education, Thaksin University Thailand

² Assistant Professor at the Department of Health and Physical Education, Faculty of Education Thaksin University Thailand.

Correspondence: Singha Tulyakul. E-mail: singha@tsu.ac.th

Abstract

This research aimed to develop and compare the effects of pyramid program weight training on the muscular strength of male swimmers. The sample group consisted of 36 male swimmers from Yulin Sports School in Guangxi Province, China, selected through cluster sampling. The participants were divided into two groups: an experimental group of 18 swimmers who trained using a pyramid program weight training developed by the researcher and a control group of 18 swimmers who trained using the standard weight training program at Yulin Sports School. The training lasted for eight weeks, with sessions conducted three days a week, each lasting 50 minutes. The bench press test was used to measure muscular strength. Data were analyzed by calculating the mean and standard deviation. The Paired Samples t-test was used to compare mean differences in muscular strength within the control and experimental groups before and after training. Additionally, the Independent Samples t-test compared mean differences in muscular strength between the control and experimental groups before and after training. The research results indicated that the pyramid program weight training developed by the researcher was effective and suitable. The experimental group exhibited significantly greater muscular strength than the control group, with statistical significance at the 0.05 level. Furthermore, both the experimental and control groups experienced substantial improvements in muscular strength after training compared to before training, also with statistical significance at the 0.05 level. These findings indicate that the pyramid program weight training developed is a valuable resource for enhancing muscular strength in male swimmers. It offers practical guidelines for athletes, trainers, and individuals interested in swimming to improve athletic performance in the future.

Keywords: Pyramid Program Weight Training, Muscular Strength, Swimming Players

1. Introduction

Swimming is a skill in which individuals float on the water's surface and utilize this buoyancy to move their bodies steadily through the water. Over time, swimming has been adapted into a competitive sport. Swimming can be

categorized into three types: competitive swimming, practical swimming, and synchronized swimming. However, this research will focus only on competitive swimming, which is the second most important compulsory sport in the Olympic Games and must be included in every edition. There are four competitive strokes: butterfly, backstroke, breaststroke, and freestyle (also known as speed stroke) (Wushan, 2001).

To become an efficient swimmer, three elements are necessary: proper and correct technique, strong mental fitness, and effective physical fitness. This research focuses only on the physical fitness of athletes. According to Lu and Wan (2002), physical fitness is essential for swimmers to achieve maximum speed. The key components of physical fitness in swimming include cardiovascular and respiratory endurance (Zhendong & Yulan, 2000), muscular endurance and speed (Xingman & Xianggun, 2010), flexibility (Guorong, 2012), and muscular strength (Daxue & Wenjun, 2002). Among these, muscular strength—defined as the ability of muscles to overcome resistance during physical activity—is particularly important for achieving high performance in all sports. Therefore, muscle strength training is essential and must be specifically designed for swimming.

Liu (2007) emphasized the importance of arm muscle strength in swimming, explaining that swimming is a sport where athletes must lie flat on the water's surface, overcoming not only their body weight but also the water's resistance. According to fluid dynamics, if the swimmer's speed doubles, water resistance increases threefold, requiring triple the physical strength to overcome it. To address this, in addition to improving technique, muscle strength must also be developed. From past theoretical studies and research, it can be concluded that competitive swimming requires explosive strength in movements, as well as muscular endurance and strength. Since water is approximately 800 times denser than air, swimmers need strong muscles and good stroke length to overcome water resistance and increase speed. When designing muscle strength training programs, it is crucial to focus on the specific muscle groups and joints used during swimming movements to improve swimming performance.

Analysis of front stroke movement shows that when the arm bends and the elbow lifts high, the upper arm must rotate and tilt inward. This movement involves several muscles: Latissimus Dorsi, Pectoralis Major, Teres Major, Teres Minor, Subscapularis, and Anterior Deltoid. During high-elbow strokes, the forearm flexes at the elbow, engaging key muscles such as the Biceps Brachii, Brachialis, Brachioradialis, and Pronator Teres. Then, the elbow extends rapidly to push water, relying on quick contractions and strength of the brachial muscles. Hence, it's vital to strengthen the elbow flexors and stabilizers. Additionally, developing strength in the Flexor Carpi Radialis, Flexor Carpi Ulnaris, and Palmaris Longus is important. Without adequate strength in these muscles, it becomes difficult to overcome hand resistance during swimming, which reduces propulsion. Therefore, strength training programs must be aligned with the natural posture and movements of swimming. There are various types of strength training programs, and nearly all of them involve gradually increasing repetitions, sets, and weights to improve strength (Mingxi, 2008).

One such method is pyramid weight training, first developed by Wascott in 1979, which follows the principle of increasing weights each week. The method involves determining 1 Repetition Maximum (1RM)—the maximum weight lifted once—to set appropriate weights. In pyramid training, athletes perform three sets: Set 1: 55% of 1RM, 10 reps; Set 2: 75% of 1RM, five reps; Set 3: 95% of 1RM, one rep. If more than one repetition is achieved in the third set, the 1RM must be recalculated. However, when training young swimmers, age must be carefully considered (Wang, 2013, Wangchun, 2000).

Children's bones contain more water and organic matter and less inorganic salt, making them flexible, resilient, and less prone to fractures (Mingxi, 2008). For young athletes with limited growth, intensive strength-specific training should be avoided. The sensitive period for developing general strength and muscle quality is between 12–17 years old. For maximum strength development, it's 10–13 years for girls and 11–13 years for boys. For speed strength, it is 7–13 years for girls and 7–16 years for boys. As athletes age, their load-bearing capacity increases. When beginning sport-specific training, coaches must consider the athlete's physiological characteristics, emphasizing general strength development through full-body dynamic exercises to help athletes control their body weight appropriately. Once the base is built, resistance training - such as with resistance bands or dumbbells - can be introduced to improve strength and speed. It's important to balance dynamic and static strength training methods during strength development.

Guangxi Province, located in southeastern China near Vietnam and adjacent to the sea, mandates swimming education in coastal or water-adjacent provinces to help students survive drowning incidents. Additionally, the province aims to continually produce new generations of swimmers, aligned with national policies. As a result, 15 sports schools have been established in Guangxi, one of which is Yulin Sports School. This school focuses on developing young swimmers aged 12–17, building both their technical skills and physical fitness to succeed senior national athletes. However, Yulin Sports School swimmers still face various issues—particularly weak arm muscle strength. Physical fitness tests using the Bench Press Test showed that most swimmers scored in the low to moderate range for upper body strength. This significantly impacts athletic performance. Moreover, the school lacks a systematic, quality training program to develop upper body strength. Past training relied on experience passed down from generation to generation, without alignment with proper scientific principles—e.g., inappropriate intensity levels and reliance mainly on bodyweight exercises, which don't effectively follow proper strength training guidelines. Therefore, based on these issues and the importance of muscular strength, I, as the swimming coach of the school, am motivated to develop a pyramid-style weight training program with higher quality and proper structure, aiming to apply it effectively with our swimmers in the future.

1.1. Research objectives

1. To develop a pyramid weight training program for improving arm muscle strength in swimmers at Yulin Sports School, Guangxi Province, China.
2. To compare the differences in arm muscle strength within the control group and the experimental group before and after the training among swimmers at Yulin Sports School, Guangxi Province, China.
3. To compare the differences in arm muscle strength between the control and experimental groups after the training among swimmers at Yulin Sports School, Guangxi Province, China.

2. Research methods

This research is experimental. The researcher used the Pretest-Posttest Control Group Design (Gall, Borg, and Gall, 1996). The group involved in this research consisted of 36 male swimmers from Yulin Sports School in Guangxi Province, China, who were selected through cluster sampling. The participants in this study were required to train for eight weeks, three days per week, specifically on Mondays, Wednesdays, and Fridays, for 50 minutes each day.

2.1 Methods for Dividing Sample Groups

1. 36 male swimmers from Yulin Sports School in Guangxi Province, China.
2. Test arm muscle strength by the Bench Press Test (McAble, Katch & Katch, 2014) in all participants.
3. Arrange the arm muscle strength values from the highest to the lowest of all participants.
4. Handle the matching method and divide the sample into groups of 18 people each (even numbers and odd numbers). This method ensured that the two groups had no different or similar abilities before training.
5. Analyze the data of both groups before the training using the Independent Samples t-test
6. Randomize the two groups of samples by drawing lots to create the experimental and control groups. It seems that the even-numbered group was trained using the Yulin Sports School weight training program. In contrast, the odd-numbered group underwent a pyramid program weight training developed by the researchers.

Data analysis: The researcher analyzed the data obtained using a computer program as follows:

1. Conduct statistical analysis to determine the control and experimental groups' mean and standard deviation.
2. Compare the differences in arm muscle strength within the control and experimental groups before and after eight weeks of training using the Paired Samples t-test.
3. Compare the differences in arm muscle strength between the control and experimental groups after eight weeks of training using the Independent Samples t-test.

3. Research results

1. The pyramid weight training program developed by the researcher was assessed for its suitability by five experts. The program's quality was evaluated using a 5-point Likert scale, with a suitability threshold set at 3.41 or higher, per Boone & Boone (2012). The results indicated that all items of the program scored between 4.2 and 5, reflecting a high level of appropriateness.

Additionally, the experts offered suggestions to enhance the effectiveness of the pyramid weight training program. One recommendation was to organize the exercise sequence so that exercises targeting large muscle groups are performed before those involving smaller groups. Another expert advised using 10RM (10 Repetition Maximum) instead of 1RM (1 Repetition Maximum) and then calculating the equivalent 1RM value to lower the risk of injury.

Moreover, the pyramid weight training program developed by the researcher was pilot-tested (Try out) for two weeks with 13 swimmers from Nanning Sports School in Guangxi Province. Based on the trial, the following improvements were made:

1. Time Management – Time was monitored and reminders were given, as athletes tended to rest longer than scheduled.
2. Equipment Preparation – Training equipment was prepared in advance and ensured to be sufficient for all participants.
3. Warm-Up and Cool-Down Supervision – The researcher gave reminders and led both warm-up and cool-down sessions to reduce fatigue and prevent injury, as many athletes initially neglected these parts of the training program.

2. A comparison of the differences in arm muscle strength results within the control group and the experimental group before and after eight weeks of training reveals that the arm muscle strength of swimmers in the experimental group significantly improved after eight weeks of training compared to their strength before training, at the .05 level. Similarly, the arm muscle strength of swimmers in the control group also showed significant improvement after eight weeks of training compared to their strength before training, at the .05 level, as illustrated in Table 1 and Table 2.

Table 1: Differences in arm muscle strength results within the control group before and after 8 weeks of training.

Period of training	N	Control group			
		Mean	SD.	t	P
Before training (C ₁)	18	0.84	0.0371	-9.006	0.001*
After training (C ₂)	18	0.87	0.0382		

*($P < .05$)

Table 2: Differences in arm muscle strength results within the experimental group before and after 8 weeks of training.

Period of training	N	Experimental group			
		Mean	SD.	t	P
Before training (E ₁)	18	0.84	0.0406	-19.927	0.001*
After training (E ₂)	18	0.97	0.0385		

*($P < .05$)

3. Comparing the differences in the arm muscle strength result between the control group and the experimental group before and after eight weeks of training, the two groups found that the arm muscle strength of swimmer after training between the experimental and control groups was better than before training at statistically significant at the .05 level as shown in Table 3.

Table 3: shows swimmers' arm muscle strength results before and after 8 weeks of training.

Group	N	The result of test							
		Before training				After eight weeks of training			
		Mean	SD.	t	P	Mean	SD.	t	P
Control group (C)	18	0.84	0.0371	0.171	.865	0.87	0.0382	7.682	.001*
Experimental group (E)	18	0.84	0.0406			0.97	0.0385		

*($P < .05$)

4. Discuss the results

The effects of a pyramid program weight training on the arm muscle strength of swimmers at Yulin Sports School, Guangxi Province, China, are discussed based on the research objectives as follows:

Research Objective 1 aims to develop a pyramid weight training program to improve arm muscle strength in swimmers. The researcher submitted the pyramid weight training program to five experts for quality assessment to evaluate its appropriateness using a 5-level Likert Scale, with a minimum acceptable score of 3.41 (considered highly appropriate) as per Boone & Boone (2012). The expert evaluations rated each item between 4.2 and 5, indicating a high level of appropriateness. Furthermore, the researcher made adjustments based on the experts' suggestions. For instance, one suggestion was to arrange the exercises so that those involving large muscle groups are performed before those targeting smaller muscle groups. Another expert recommended using the 10RM (10 Repetition Maximum) method instead of 1RM (1 Repetition Maximum) to calculate training loads, and then converting it to an estimated 1RM value to reduce the risk of injury (using the formula: 75% of 1RM = 100% of 10RM).

The pyramid weight training program was also tested and revised to address problems and deficiencies, ensuring the highest possible quality. This process was supported by the researcher's study of training principles, including the steps and methods for developing pyramid weight training programs, which were based on the F.I.T.T. principle—an internationally accepted training guideline used to enhance physical fitness. This is in accordance with the American College of Sports Medicine (ACSM, 2021) and Garber et al. (2011), who state that the FITT principle is a framework for designing effective and individualized exercise programs. FITT stands for:

1. F – Frequency: How often one exercises, such as 3–5 times per week. For weight training, 2–3 times per week is recommended.
2. I – Intensity: The difficulty of the exercise, often determined by weight, repetitions, and sets. Moderate to heavy weights with 6–12 reps are ideal to improve muscle strength.
3. T—Time: The duration of each training session. For weight training, 30–60 minutes per session is recommended.
4. T—Type: The kind of exercise selected to match the goal. Weight training is recommended to build muscle strength.

In addition, the appropriateness of the developed training program—rated at 3.41 or higher—aligns with Boone & Boone (2012), who affirm that tools rated at or above this score are highly appropriate and can be considered reliable and usable for achieving the stated objectives. The pyramid training program was further improved following expert recommendations, such as sequencing exercises to start with larger muscle groups and gradually progress to smaller ones, to prevent excessive muscle fatigue.

Moreover, piloting the developed training program (try-out phase) helped enhance its completeness by identifying and addressing issues such as time management, proper warm-up and cool-down protocols, and the use of 10RM instead of 1RM to reduce injury risks. These practices are crucial for the effectiveness of the program. This approach is consistent with DeVellis (2016), Nunnally & Bernstein (1994), Taherdoost (2016), and Babbie (2020), who emphasized that try-outs are essential steps in improving the quality of research tools and processes. They enhance validity, reliability, and content appropriateness, while reducing errors before actual implementation—thus making data collection more efficient and yielding more accurate results.

Research Objective 2 aimed to compare the differences in arm muscle strength within the control group and the experimental group before and after the training among swimmers at Yulin Sports School, Guangxi Province, China. The research results revealed that arm muscle strength in both the experimental group (trained using the pyramid weight training program) and the control group (trained using the Yulin Sports School's standard program) significantly improved after 8 weeks of training, with statistical significance at the 0.05 level. The improvement could be attributed to adherence to principles aimed at increasing muscle strength for the experimental group trained with the researcher-developed pyramid weight training program. Specifically, muscle strength training requires progressive overload, typically involving heavier weights and fewer repetitions (high resistance, low repetition). Moreover, the program was structured to include training 3 days per week for eight consecutive weeks, likely contributing to the noticeable improvement in arm strength. This finding is consistent with the American College of Sports Medicine (2009) and Baechle & Earle (2008), who emphasized that strength training must follow the principle of progressive overload, meaning weight or resistance should gradually increase as the body adapts, and the principle of consistency, meaning training should occur regularly 2–4 times per week for continuous improvement. Similarly, Prasetyo and Nasrulloh (2017) studied the effects of pyramid training on leg and back muscle strength in sports science students and found that pyramid training significantly enhanced targeted muscle strength.

However, even in the control group that followed the regular Yulin Sports School training program, which did not strictly adhere to formal training principles, improvements in arm muscle strength were also observed after the 8-week training period. This may be due to the program's use of body weight resistance training. Body weight exercises are also considered a form of resistance training, generally including three types of equipment: 1). Free weights, such as barbells and dumbbells 2). Machine weights, such as multi-functional weight machines, and 3). Body weight, using one's own body as resistance—e.g., push-ups, pull-ups, sit-ups, etc. The Yulin Sports School's program also maintained consistency with three training days per week over 8 weeks, which contributed to improvements in arm muscle strength. This aligns with Srimuang, Pho-ngam and Phimit (2021), who stated that bodyweight training enhances muscular strength and flexibility by using one's own body as resistance without the need for equipment. This form of training follows general strength training principles, including progressive overload—by increasing reps or sets, reducing rest time, or using more complex movements—and consistency, which involves regular and ongoing training to help the body adapt and develop muscular strength effectively.

Research Objective 3 aimed to compare the differences in arm muscle strength between the control group and the experimental group after training among swimmers at Yulin Sports School, Guangxi Province, China. The research findings indicated that after 8 weeks of training, the experimental group—trained using the pyramid weight training program—demonstrated significantly greater arm muscle strength than the control group, which followed Yulin Sports School's standard training program. The difference was statistically significant at the 0.05 level. This result may be attributed to the pyramid weight training program developed by the researcher, which followed appropriate and scientifically supported principles, leading to enhanced development of arm muscle strength in swimmers. The program was structured according to the F.I.T.T. principle, which includes four key components: 1). F – Frequency: Training was scheduled 3 days per week. 2). I – Intensity: The training progressively increased in weight load, with the 10RM (10 Repetition Maximum) recalculated weekly. If athletes could perform more than one additional repetition in the third set, a new 10RM was determined. 3). T – Time: Each training session lasted approximately 50 minutes., and 4). T – Type: The training type was pyramid weight training, a format that effectively improves arm muscle strength. These findings align with the work of Muhmut (2019), Heyward (1991), and Naternicola (2015), who emphasized the importance of the F.I.T.T. principle in designing exercise programs that improve athletes' physical fitness. This result is also consistent with the research of Tulyakul (2009), who

studied the physical fitness of pétanque athletes by enhancing arm muscle strength using pyramid-style weight training. The study involved 20 athletes from Huai Yot School in Trang Province, divided into two groups of 10 each. The experimental group trained using the pyramid weight training method, while the control group followed a free-form training regimen. Both groups trained 3 times per week over 8 weeks. The results showed that the experimental group had significantly higher mean arm muscle strength than the control group, with statistical significance at the 0.05 level. Additionally, Kiram (2020) studied the effects of standard pyramid and reverse pyramid training on muscle hypertrophy in the arms and thighs. The findings revealed that standard pyramid training effectively increased muscle size in both areas. Moreover, the standard pyramid method yielded better results than the reverse pyramid method in terms of muscle growth in the arms and thighs.

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AI in Higher Education: A Case Study Examining Decision-Making Shifts and Personalised Learning Through Educators' Perspectives

Pauline P. L. Chin¹

¹ Meragang Sixth Form College, Brunei Darussalam

Abstract

Examining educators' perspectives on integrating artificial intelligence (AI) into higher education, this qualitative investigation focuses on decision-making processes and AI-driven personalised learning. Through semi-structured interviews with seven experienced educators from the humanities (including art) and sciences, nine themes emerged in three categories: pedagogical implications, operational considerations, and ethical-professional dimensions. The findings point towards a hybrid model where AI manages routine tasks whilst educators retain pedagogical authority. Although educators did not perceive AI-driven personalised learning as a direct threat to comprehensive education, they highlighted the significance of careful implementation to maintain academic integrity and critical thinking abilities. Key implications for curriculum development, policy reform, and professional development stress the importance of maintaining human judgement. These insights present practical recommendations to effectively include AI whilst preserving the irreplaceable human elements in educational pedagogies.

Keywords: Academic Integrity, Artificial Intelligence in Education, Pedagogical Decision-Making, Personalised Learning, Professional Development

Preface

My engagement with AI and education emerged from firsthand classroom observations, where I witnessed how thoughtfully integrated technology could transform learning experiences and engage students in meaningful ways. A significant turning point came during the COVID-19 pandemic, when the Ministry of Education of Brunei Darussalam provided laptops and tablets with data credits to students from disadvantaged backgrounds at my workplace. Through direct observation of this initiative, I discovered that meaningful educational technology integration requires access to digital tools and structured development of essential digital literacy skills.

This study examines teachers' firsthand experiences with AI in their classrooms, whilst reflecting my commitment to creating an inclusive AI-enriched learning environment. Their insights are crucial for understanding the effective implementation of educational technology.

1. Introduction

Artificial intelligence (AI) integration in education involves a substantial, complex progression that creates significant advantages and presents identifiable difficulties. AI transforms educational methodologies by improving efficiency and personalised learning experiences, as well as redefining administrative functions. Related technologies can provide significant support to AI applications. Integrating AI technologies into educational methodologies is emphasised by Selwyn (2022) as he advocates for a thoughtful examination of their anticipated outcomes and impacts. Arvin et al. (2023) also stress how AI can influence educational administration, which enhances teaching and learning processes.

AI integration can create advanced teaching and learning tools which enhance student comprehension and engagement. Zouhri and El Mallahi (2024), who study both AI and related educational technologies, explore how AI transforms teaching approaches, improving learning outcomes. This integration enables dynamic educational environments where students receive real-time feedback, effectively connecting theoretical knowledge with practical application. AI's analytical capabilities facilitate personalised learning experiences and optimise administrative processes (Popenici & Kerr, 2017; Begum, 2024).

AI integration in higher education raises ethical concerns. Addressing academic integrity, algorithmic biases, and the implementation of emerging technologies is necessary as this preserves educational values whilst taking advantage of technological developments. Eysenbach (2023) addresses the crucial need for transparency in algorithmic functions and advocates for fairness in their practical application, whilst Barua et al. (2022) caution that an intensified dependence on AI may detrimentally influence students' critical thinking and could possibly diminish their skill proficiency. Park and Kwon (2024) assert that promoting digital equity and accessibility is essential in adopting new educational technologies because unequal access could disadvantage specific learners.

Therefore, ethical considerations are prominent. The frameworks that regulate technological applications must adapt and ensure that new applications remain relevant and practical. Chen et al. (2023) assert the significance of establishing ethical guidelines to address the potential risks that may emerge from the influence of AI in educational contexts. Xusheng and Komolafe (2020) urge educators to integrate modern instructional methodologies that facilitate collaboration between technological innovations and human thought processes. This shift demands reevaluating teaching practices to ensure educators remain effective and relevant in influencing AI capabilities for educational purposes (Walter, 2024).

Although AI offers valuable benefits, it creates issues that require thorough examination. This study aims to enrich a continuous discussion on the responsible implementation of this technology and advocates a balanced approach that realises its educational advantages whilst alleviating potential drawbacks.

1.1. Aim and Purpose

The aim is to analyse the viewpoints of higher education educators regarding the role of artificial intelligence in pedagogies, the benefits and challenges of its integration, and their perceptions of the ethical issues that arise within educational contexts. The study will consider how AI applications in education can be effectively integrated into higher education pedagogies. By understanding educators' lived experiences and bridging the gap between theoretical possibilities and practical implementation, this study aims to generate insights that can inform professional development frameworks and curriculum design for more effective AI integration in higher education.

1.2. Rationale

This research addresses three crucial gaps in understanding AI integration in higher education. First, whilst studies have examined AI's technical implementation, limited research explores educators' lived experiences with AI-enhanced teaching. Second, though AI's potential for personalised learning receives attention, only some studies examine how this affects comprehensive education delivery. Third, the shift in educational decision-making prompted by AI requires thorough investigation from educators' viewpoints.

The focus on educators' perspectives is significant as they directly encounter the changes AI introduces to teaching and learning processes. Their insights uncover practical challenges and opportunities that may need to be more apparent in theoretical frameworks. Moreover, their experiences highlight the balance between AI-driven efficiency and maintaining meaningful human interaction in education. Their perspectives on decision-making processes assist in identifying areas where AI can enhance rather than substitute human judgement. Understanding these aspects proves essential as educational institutions increasingly adopt AI technologies. The findings will help inform policy development, professional training programmes, and implementation strategies for AI in higher education.

1.3. Research Questions

Based on these rationales, the study addresses two primary questions:

RQ1. How does AI integration shift the balance of decision-making in higher education teaching?

This question examines changes in pedagogical authority and decision-making processes. It explores how educators adapt their teaching approaches with AI support, whilst investigating the balance between automated and human-led educational decisions.

RQ2. Do educators view AI-driven personalised learning as a threat to comprehensive education?

This question explores tensions between personalisation and broad educational goals. It examines educators' views on maintaining educational quality with AI integration, whilst investigating strategies for balancing individualised learning with collective educational experiences.

2. Literature Review

This review explores five areas essential to understanding AI integration in higher education. First, it investigates the foundational elements of artificial intelligence and augmented reality in education. Second, it analyses teacher preparation requirements for effective AI implementation. Third, it evaluates infrastructure requirements crucial for AI integration. Fourth, it considers digital equity issues affecting AI adoption. Fifth, the literature review links existing studies to the study's aims, stressing its significance and identifying knowledge gaps. These five areas as follows outline a structured flow in exploring the views of the participants.

2.1. Artificial Intelligence

2.1.1. Foundation and Impact on Teaching Methods

AI represents a groundbreaking innovation that presents new opportunities for teaching and learning (Huang et al., 2024; Dwivedi et al., 2021). AI enables computational systems to learn and self-correct, supporting pedagogical decision-making and enriching educational experiences. Whilst related technologies like augmented reality (AR) can complement AI in some contexts by enhancing environmental perception through digital information overlay, AI remains the primary driver of educational transformation (Makhataeva, 2023).

AI has become a powerful tool for transforming teaching methods, offering innovative approaches to personalised instruction (Kırıkkaya & Başgöl, 2019). Research demonstrates the effectiveness of these technologies in improving student engagement through interactive content (Dhar et al., 2021). Selwyn (2022) emphasises the significance of including AI technologies in educational settings, urging thoughtful examination of potential consequences. Arvin et al. (2023) highlight AI's significant impact on educational institution management, possibly leading to better teaching and learning outcomes. Zouhri and El Mallahi (2024) explore how AI transforms teaching approaches, demonstrating measurable improvements in learning outcomes.

2.1.2. AI-Driven Learning Enhancement and Collaboration

AI creates immersive educational environments that extend beyond traditional learning approaches. Barua et al. (2022) demonstrate how AI technologies analyse student performance patterns to personalise content delivery. In complementary research, Zouhri and El Mallahi (2024) explore AI applications, including those that may incorporate AR elements for interactive visualisations. These studies show how AI transforms educational experiences—adapting content difficulty to individual learning needs whilst enhancing comprehension through various digital interfaces. AI-driven systems provide contextual, just-in-time information that converts passive observation into active engagement with educational materials.

Collaborative learning environments benefit from AI integration, though Schemmer et al. (2022) identify specific challenges related to user trust and system interpretation. Their research reveals that students initially question the reliability of AI-generated feedback, requiring transparent explanations of algorithmic processes to build confidence. Despite these hurdles, their findings demonstrate that properly implemented AI tools can enhance peer collaboration by identifying optimal group formations based on complementary skills and learning preferences.

AI's analytical capabilities extend beyond individual student support to transform institutional processes. Popenici and Kerr (2017) identify how predictive analytics can anticipate resource needs and optimise scheduling, whilst Begum (2024) examines AI's role in automating administrative workflows that previously consumed significant teaching time. These operational efficiencies allow educators to reallocate attention to high-value interactions with students, fundamentally changing how educational institutions function.

Effective learning enhancement through technology requires systematic institutional approaches. Chan (2023) emphasises the importance of establishing clear frameworks for technology integration that align pedagogical goals with technological capabilities. This structured approach contrasts with Kennedy's (2023) focus on infrastructure requirements, arguing that even well-designed frameworks cannot succeed without robust technical support systems. These perspectives highlight how learning enhancement through AI depends on conceptual frameworks and practical implementation considerations.

2.2. *Implementation and Support Framework*

2.2.1. Technical Infrastructure and Resources

The successful integration of AI in education requires thoughtful consideration of technological infrastructure. Chan (2023) provides a comprehensive AI policy framework highlighting the importance of operational infrastructure and training support. Moldavan et al.'s (2021) research reveals how educators navigate technological challenges, emphasising the need for reliable access and consistent technical support.

Resource planning plays a crucial role in successful implementation. Hashim et al. (2022) examine institutional approaches to technology integration, demonstrating how strategic resource allocation supports successful initiatives. Begum (2024) explores how robust technical support structures facilitate AI adoption, whilst Kamalov et al. (2023) examine how administrative processes evolve with AI implementation, highlighting the need for sustained resource commitment.

2.2.2. Professional Development and Training

Educators require comprehensive training and ongoing professional development to integrate AI effectively. Rueda and Batanero's (2022) research emphasises the importance of enhanced ICT professional development for addressing diverse learner needs. Weisberg and Dawson (2023) highlight how pre-service teacher education programmes can integrate technological capabilities. Walter (2024) suggests educators need both a theoretical understanding of AI and practical skills in its application.

Assessment strategies must evolve alongside AI implementation. Khan (2023) explores adapting traditional assessment methods to AI-enhanced environments whilst maintaining academic integrity. Gobniece and Titko (2024) examine developing competencies for evaluating student work in digital contexts, whilst Chen et al. (2023) propose frameworks for maintaining assessment quality with AI tools.

2.2.3. Change Management and Implementation Strategies

The transition to AI-enhanced teaching environments suggests careful change management. Xusheng and Komolafe (2020) emphasise evolving educator roles in technology-driven environments. Zouhri and El Mallahi (2024) examine quality-focused adaptations in teaching practices, whilst Arvin et al. (2023) provide insights into effective transition strategies. Kennedy (2023) shows how enhanced ICT infrastructure can support teacher education.

Ibrahimi (2024) suggests pedagogical development might enhance ICT implementation. Huang et al. (2024) examine how teacher enthusiasm affects technology adoption, whilst Gyawali and Mehndroo (2024) explore opportunities for navigating digital transformation.

These professional development considerations inform implementation frameworks, which must address both technical and pedagogical needs. Arvin et al. (2023) provide insights into effective transition strategies, whilst Kennedy (2023) shows how enhanced ICT infrastructure can support teacher education. Their findings emphasise the importance of comprehensive support systems that address AI implementation's technical and pedagogical aspects.

2.3. Pedagogical Considerations

2.3.1. Assessment Strategies

The evolution of AI technologies requires new approaches to assessment whilst maintaining academic integrity. Khan (2023) explores how traditional assessment methods can adapt to AI-enhanced environments, emphasising the need to balance technological innovation with academic standards. Gobniece and Titko (2024) examine developing competencies for evaluating student work in digital contexts, especially when verifying authentic student learning.

Digital assessment strategies must address both technical capabilities and educational quality. Chen et al. (2023) propose frameworks for maintaining assessment integrity with AI tools, whilst Eysenbach (2023) emphasises the need for transparent algorithmic processes in assessment and analytics.

2.3.2. Skills Enhancement

The integration of AI technologies into educational contexts requires developing skill sets among teachers and students. Rueda and Batanero's (2022) research highlights how strengthened digital literacy capabilities significantly contribute to addressing varied student learning requirements. Their work emphasises practical approaches to technology implementation across different learning contexts.

A contrasting perspective emerges from Barua et al. (2022), who raise concerns regarding how AI tools might potentially undermine students' ability to think independently. Their findings suggest that overreliance on technological assistance could diminish analytical reasoning, especially when students become dependent on AI-generated solutions without understanding underlying principles. This tension highlights why educators need balanced pedagogical strategies that include technological advantages whilst preserving fundamental cognitive development.

In related work, Walter (2024) stresses the importance of developing twin competencies: understanding AI systems and maintaining robust analytical thinking. Walter's research examines how these skills complement each other in

technology-rich learning environments. Likewise, Huang and colleagues (2024) investigate how teachers' confidence and positive attitude towards technology significantly influence successful classroom technology adoption. Their study revealed correlations between teacher motivation and the effective integration of technology across various educational settings.

2.3.3. Educational Quality Assurance

Maintaining educational quality requires a careful analysis of numerous factors. Park and Kwon (2024) address the issues of digital equality and accessibility, arguing for the urgent implementation of inclusive frameworks in AI applications. However, this perspective contrasts with Xusheng and Komolafe (2020), who stress that educators' roles in technology-driven settings are evolving, whilst proposing alternative educational methodologies to uphold quality whilst embracing innovation.

Quality assurance also integrates the assessment of ethical issues in AI use. Chen et al. (2023) support strong ethical frameworks in AI-enhanced education. This differs from Eysenbach's (2023) emphasis on the significance of algorithmic fairness and transparency. Zouhri and El Mallahi (2024) illustrate that successful AI adoption requires a balance between new technologies and established pedagogical practices to uphold educational standards.

The merging of AI with traditional teaching methods presents opportunities to improve educational quality. Popenici and Kerr (2017) investigate how AI can enhance teaching and learning processes whilst preserving academic standards. Begum (2024) looks into the role of AI in facilitating quality education delivery, stressing the need for maintaining human oversight in educational practices.

2.4. Digital Equity and Access

2.4.1. Access and Opportunity Gaps

Digital equity remains a central concern as AI technologies become integral to educational practices. The digital divide affects technological access and learning opportunities (Lutz, 2019). Moldavan et al. (2021) highlight how variations in technology access among teachers affect instructional effectiveness, whilst Prodani et al. (2020) demonstrate how equitable access to digital technologies enhances learning outcomes across different socioeconomic contexts.

2.4.2. Impact on Educational Development

Park and Kwon (2024) explore how equitable AI implementation supports comprehensive student development. Their findings align with Rana et al.'s (2021) study of rural teachers in Nepal, revealing opportunities for targeted technology support in underserved educational settings. Weisberg and Dawson (2023) demonstrate how equity pedagogy can effectively integrate with AI advancement to support inclusive education.

2.4.3. Support Strategies

Research indicates that addressing digital equity requires collaborative solutions. Chen et al. (2023) and Hashim et al. (2022) stress the importance of community participation and institutional approaches in reinforcing digital inclusion efforts, especially in applying AI technologies across various educational environments.

2.5. Research Gaps and Literature Relevance

2.5.1. Identified Research Gaps

The reviewed literature reveals several important gaps in the current understanding. Firstly, whilst Dhar et al. (2021) demonstrate AI's effectiveness for student engagement, longitudinal research tracking its effects on student

development over multiple years remains markedly absent. Secondly, Barua et al. (2022) examine AI in education broadly, yet research specifically investigating how AI integration varies across academic disciplines, especially in the creative arts and humanities, is significantly limited. Thirdly, although Rueda and Batanero (2022) discuss the importance of digital competencies, they provide insufficient exploration of the specific professional development requirements for educators transitioning to AI-enhanced teaching environments. Moreover, the current literature inadequately addresses how traditional assessment methods should evolve in response to AI integration, especially concerning the verification of authentic student work and the evaluation of critical thinking skills.

2.5.2. Foundation for Current Research Questions

The literature reviewed addresses this study's two primary research questions about AI's impact on decision-making and personalised learning in higher education. Barua et al.'s (2022) work shows how AI-enabled tools influence instructional decisions, whilst Zouhri and El Mallahi (2024) highlight AI's transformative impact on educational decision-making processes. Kamalov et al. (2023) demonstrate how AI shifts administrative tasks towards strategic initiatives, and Hashim et al. (2022) show the movement towards data-informed teaching decisions.

On personalised learning and comprehensive education, Kırıkkaya and Başgöl (2019) demonstrate improved student engagement through technology integration, whilst Barua et al. (2022) caution about the effects on critical thinking skills. Gobniece and Titko (2024) raise concerns about academic integrity, whereas Gyawali and Mehndroo (2024) and Popenici and Kerr (2017) highlight adaptive learning benefits. Research on teacher preparation (Rueda & Batanero, 2022; Weisberg & Dawson, 2023) and infrastructure challenges (Chan, 2023; Moldavan et al., 2021) provide context for understanding educator perspectives. Studies by Khan (2023) and Gobniece and Titko (2024) emphasise the challenge of balancing personalised learning with academic integrity.

This literature review highlights the need to investigate educator perspectives on AI's role in decision-making and personalised learning directly, supporting this study's aims whilst addressing identified gaps in current research.

3. Methodology

Braun and Clarke's (2012) thematic analysis framework guided the identification of patterns and themes from participant responses.

3.1. Research Design

A qualitative methodology was chosen to explore educators' experiences and perceptions regarding AI integration in teaching practices. This approach allowed for a detailed examination of participants' views on decision-making processes and personalised learning in AI-enhanced educational environments.

3.2. Participants and Sampling

3.2.1. Selection Criteria

Purposive sampling was employed to select participants with experience using or overseeing AI-driven learning technologies. Participants were recruited via email invitations from Brunei's educational institutions known for their established AI initiatives. The selection criteria included current educators with a minimum of 10 years of teaching experience, direct experience using AI in teaching methods, and familiarity with ethical concerns related to AI in education.

3.2.2. Sample Characteristics

The final sample comprised seven educators—five female and two male—aged 37 to 46. Three held Master's degrees, and four had completed doctoral studies. Their teaching experience spanned 10-18 years, with four from humanities (including language teaching and arts education) and three from science disciplines (including mathematics).

3.3. Data Collection

The study's design centred on five significant areas: academic integrity in AI-enhanced education, AI's contribution to administrative efficiency, the influence of data-driven insights on teaching methodologies, AI's role in personalised learning, and associated ethical considerations. These areas formed the foundation for subsequent thematic analysis. Interview sessions were held in chosen quiet settings, with prior consent for audio recording obtained, and the conversations were transcribed verbatim. Field notes supplemented recordings to capture critical points for exploration.

3.4. Data Analysis

The analysis followed Braun and Clarke's (2012) six-step thematic analysis approach. This process began with familiarisation with data through multiple transcript readings, followed by generation of initial codes. The next steps involved searching for themes, reviewing themes, defining and naming themes, and finally, report production.

This systematic process resulted in nine themes, organised into three categories. The first category, pedagogical implications, encompassed critical thinking concerns, over-reliance on AI, and personalised learning. The second category, operational considerations, included administrative efficiency, data insights, and human judgement alongside AI. The third category, ethical and professional dimensions, comprised academic integrity, ethical concerns, and changing educators' roles.

4. Findings and Data Interpretation

Insights gained from semi-structured interviews revealed educators' views on AI integration in enhancing teaching practices in higher education. Nine themes were discerned and organised into three main categories: ethical-professional dimensions, operational considerations, and pedagogical implications. Each category signifies the role of AI in teaching that focuses on a variety of benefits and challenges connected to its adoption.

4.1. Pedagogical Implications

4.1.1. Critical Thinking Concerns

Concerns about the retention of critical thinking skills in an AI-enhanced educational environment have been frequently articulated by educators. A primary concern was students' overreliance on AI-generated content (Participant 1), especially with respect to their proficiency in evaluating information critically. In science education, emphasis was placed on developing fundamental reasoning skills (Participant 3), with AI viewed as a support tool rather than a replacement for cognitive development. Similar concerns emerged in art teaching (Participant 7), where spontaneity and real-time adaptation were deemed essential skills that technology could not adequately replicate.

4.1.2. Over-reliance on AI

The risk of students becoming passive learners emerged as a significant concern. Participants expressed worry that excessive AI dependence might hinder independent thinking development. When examining science instruction, data collected revealed concerning patterns where students excessively dependent on AI tools showed diminished

capacity to solve problems independently. As Participant 3 explained, students often bypassed crucial analytical development by relying on AI-generated solutions rather than working through problems methodically. This observation underlines why structured, sequential learning remains essential for developing authentic comprehension of scientific concepts.

Likewise, perspectives from art education highlighted complementary concerns. Participant 7 specifically emphasised that students need exposure to unexpected creative challenges—situations where predetermined solutions are not readily available. Their observations suggest that whilst AI can effectively customise individual learning experiences, it potentially deprives students of formative struggles that naturally cultivate adaptability and persistence. These qualities, the participant noted, are especially vital in artistic disciplines where innovation often emerges from navigating constraints.

4.1.3. Personalised Learning

Whilst acknowledging AI's potential for personalisation, educators identified tensions between adapted learning and comprehensive education. Most participants recognised benefits but expressed caution about maintaining educational breadth. Participant 4, from a science background, emphasised the need to balance AI's ability to adapt to individual learning paces with developing collaborative skills through peer interactions, especially in laboratory settings. Participant 6 observed that whilst AI could provide personalised feedback on grammar and vocabulary in language teaching, authentic communication skills required human interaction. The limitations of AI-driven personalisation were especially evident in performance-based disciplines, where real-time adaptation and spontaneity were deemed essential to the learning process.

4.2. Operational Considerations

4.2.1. Administrative Efficiency

The integration of AI in administrative tasks revealed a complex balance between efficiency and personal engagement. Basic administrative functions, such as assignment management and grading, demonstrated clear benefits in time-saving (Participant 1), allowing educators to focus on meaningful student interactions. The science classroom provided insights into how AI could effectively track concept progression (Participant 3), though educators emphasised the continued importance of personal review for understanding student thinking processes. Whilst acknowledging AI's utility in structuring feedback and planning (Participant 7), educators consistently stressed the need to maintain human oversight of these processes.

These findings directly illustrate how AI integration shifts decision-making processes in higher education. The interviews revealed a multifaceted approach to administrative responsibilities in AI-enhanced environments. Participant 1 described how AI systems efficiently manage time-consuming tasks such as preliminary assignment evaluation, yet emphasised that teachers deliberately retain final authority over assessment outcomes. This deliberate distribution of responsibilities creates what might be described as a complementary relationship—AI handles repetitive procedural elements whilst human expertise guides evaluation strategies. In discussing this relationship, Participant 3 offered additional insights. They described how shifting basic administrative tasks to AI systems creates space for teachers to concentrate on intricate teaching choices. Such decisions, according to this participant, rely heavily on the educator's expert knowledge and their unique understanding of how each student progresses. Throughout the interviews, a common perspective emerged - rather than seeing technology as a substitute for human expertise, the participants viewed AI as an enabling instrument. This tool, they suggested, strengthens their capacity to engage with the intellectually challenging elements of teaching that cannot be automated.

4.2.2. Data-Driven Insights

A marked shift appeared from data-driven to data-informed decision-making approaches.

Whilst educators recognised the value of AI-generated data, they consistently emphasised the need for human interpretation in its application. Some educators expressed caution about the limitations of purely numerical analysis (Participant 2), stressing the importance of focusing on qualitative aspects of education. The humanities perspective revealed how AI could effectively identify writing patterns (Participant 5), though evaluating the depth and quality of academic arguments remained firmly within the domain of human expertise. In art education, initial scepticism about AI data's relevance gave way to appreciating its utility (Participant 7), especially in monitoring student engagement across various artistic media.

4.2.3. Human Judgement Alongside AI

The integration of AI insights with human judgement emerged as crucial for effective teaching. Educators viewed AI as a tool to enhance rather than replace human decision-making. Participant 4 emphasised that performance patterns identified by AI represented only part of the educational narrative. From a science teaching perspective, Participant 3 highlighted how human expertise was essential in understanding the conceptual barriers behind computational difficulties that AI might identify. The value of AI in detecting patterns in student progress was noted in art education (Participant 7), although this participant also maintained that this technology should complement rather than lead the design of personalised challenges for creative development.

4.3. *Ethical and Professional Dimensions*

4.3.1. Academic Integrity

The evolution of AI tools has challenged traditional concepts of academic integrity, creating new complexities in maintaining educational standards. Educators pointed out the complexities involved in verifying authentic student work. Humanities educators emphasised that plagiarism detection applications must address current challenges because the focus has changed from recognising copied content to scrutinising the authenticity of intellectual processes.

The impact varied across disciplines, with science educators prioritising understanding of underlying principles over merely obtaining correct numerical results, whilst arts educators struggled with assessing creative processes when AI tools are employed in the ideation phase.

The distinction between AI-assisted versus AI-dependent activities has surfaced as a critical factor in creative disciplines. Participants acknowledged altering their assessment strategies, opting for in-class evaluations instead of take-home assignments that emphasise the necessity of real-time critical thinking.

Process-based evaluation has gained prominence, with educators requiring documentation that illustrates students' thinking processes through their drafts and subsequent revisions. This change signifies a transformation in the concept of academic integrity and its enforcement in modern higher education.

4.3.2. Ethical Concerns

Beyond academic integrity, AI integration in education presents distinct ethical challenges. Research participants highlighted data protection concerns in AI-enabled learning systems, supporting Chen et al.'s (2023) call for robust ethical frameworks. The necessity for transparent algorithmic processes in assessment and analytics emerged as crucial, aligning with Eysenbach's (2023) emphasis on algorithmic fairness. Educators noted potential risks in AI-based student profiling, echoing Park and Kwon's (2024) research on equity and access challenges in technological implementation.

4.3.3. Changing Educator Roles

The adoption of AI in education has fundamentally redefined educators' professional responsibilities and identity, corroborating the claims made by Xusheng and Komolafe (2020) regarding the critical need to evolve with new pedagogical approaches.

The participants described a transformation from traditional teaching roles to becoming facilitators in AI-enhanced learning environments. This reflects Walter's (2024) emphasis on the importance of AI literacy and analytical thinking in current educational pedagogy. This transition required developing new skill sets whilst ensuring the retention of educational expertise, as reflected in Rueda and Batanero's (2022) research on the growth of digital competence.

Science educators reported adapting their instructional approaches to emphasise conceptual understanding over technical skills, whilst humanities educators described evolving their roles to focus more on developing critical analysis and interpretative capabilities. These adaptations align with Barua et al.'s (2022) findings regarding the implications of AI reliance on students' critical thinking skills. Research findings align with Zouhri and El Mallahi's (2024) work on evolving teaching practices, highlighting how effective AI adoption requires balancing new technologies with proven pedagogical methods.

5. Discussion

This study revealed two fundamental shifts in higher education: the evolving role of educators and the tension between personalised and comprehensive education. These findings both support and extend current research whilst revealing new insights across different educational contexts.

5.1. Research Findings and Theoretical Alignment

5.1.1. Critical Thinking and Pedagogical Impact

The findings regarding educators' concerns about critical thinking align with Barua et al.'s (2022) research, particularly in STEM fields where educators identified specific concerns about students' reliance on AI for answers without developing conceptual understanding. In the humanities, the research revealed new concerns about students bypassing essential analytical and synthesis processes, extending beyond the current literature.

5.1.2. Evolution of Educator Roles

As AI manages routine tasks, educators' roles have shifted from instructors to facilitators and interpreters of AI outputs. This transformation aligns with Zouhri and El Mallahi's (2024) research but reveals specific implications for teaching practices. Educators have adopted sophisticated assessment methodologies integrating AI capabilities with professional expertise, establishing innovative frameworks whilst retaining instructional authority.

Teaching practices now combine technology-enhanced instruction with essential interpersonal elements, requiring continuous professional development in both digital and pedagogical expertise. These observations align with Huang et al.'s (2024) research, revealing new insights into practical implementation challenges in contemporary teaching environments.

5.1.3. Personalised Learning and Educational Breadth

The study revealed more substantial concerns about maintaining educational breadth than previously identified in the literature. These findings support and extend Hashim et al.'s (2022) research on AI-enabled personalisation. Educators emphasised the challenge of balancing individualisation with collaborative learning, noting that whilst AI excels at personalised instruction, it must not compromise peer interaction benefits. The research highlighted how instructors integrate technological personalisation with established pedagogical methods to develop analytical skills. Teachers in the study frequently mentioned fair access to learning technology as a significant priority. They believed personalised learning should benefit every student, whether from affluent or disadvantaged communities.

5.2. Implementation Challenges and Opportunities

The study identified three areas affecting successful AI integration:

5.2.1. Teacher Preparation

The findings support Rueda and Batanero's (2022) research and emphasise the need for comprehensive training in AI implementation. The study extends their work by identifying specific areas where educators need support in balancing technical skills with pedagogical judgement, aligning with Ibrahim's (2024) research on effective ICT implementation.

5.2.2. Infrastructure Requirements

The findings validate Chan's (2023) framework on operational infrastructure whilst revealing new insights into how technical resources directly affect teaching choices. Kennedy's (2023) identification of resource barriers proves especially relevant, with the study providing specific examples of how inadequate technical support impacts AI implementation. Significantly, the availability and reliability of infrastructure emerged as a key factor influencing educators' decision-making capacity. Begum (2024) emphasises how robust technical infrastructure enables more confident and informed decisions about AI integration in teaching practices, whilst infrastructure limitations often lead to more conservative decision-making approaches. Based on the current study's findings, this relationship between infrastructure and decision-making authority demonstrates how technical resources fundamentally shape educators' ability to make and implement pedagogical choices effectively.

5.2.3. Digital Equity Considerations

Building on Prodani et al.'s (2020) work on technology access, this study reveals more detailed insights into how unequal AI access affects educational quality. The findings align with Moldavan et al.'s (2021) research whilst offering new perspectives on maintaining educational standards across diverse student populations. Park and Kwon (2024) suggest that addressing these equity challenges requires long-term strategic planning and continuous assessment of access barriers.

This equity consideration affects the ability to deliver personalised learning experiences, as highlighted in section 5.1.3, where the balance between individualisation and comprehensive education depends heavily on equitable access to AI tools.

The current study's findings indicate that future success in AI integration depends on providing equitable access and ensuring sustained support for diverse learning communities, especially as AI technologies continue to evolve in educational settings.

6. Analysis of Research Questions

6.1. RQ1: How does AI integration shift the balance of decision-making in higher education teaching?

AI's role is to complement teachers' abilities. Whilst AI addresses routine functions like assessment grading and adjusting learning speeds, educators remain in charge of making critical pedagogical decisions. This creates a balanced approach where AI manages data-driven, routine administrative decisions whilst educators retain control of pedagogical decisions requiring empathy and context. The findings align with Zouhri and El Mallahi (2024), who emphasise teaching quality while adapting to AI integration. A collaborative space emerges where AI insights inform but do not determine educator choices, especially in areas requiring an in-depth understanding of student learning processes (Participant 1 and Participant 4). This extends Barua et al.'s (2022) work on AI's role in education, demonstrating how this balanced decision-making approach helps preserve critical thinking whilst utilising AI's administrative capabilities.

6.2. RQ2: Do educators view AI-driven personalised learning as a threat to comprehensive education?

Educators demonstrate an in-depth understanding of AI-driven personalised learning rather than viewing it as a direct threat. Whilst acknowledging its benefits for individual student progress, educators identify specific areas requiring careful consideration. As evidenced by science educators (Participant 3), there are concerns about maintaining fundamental understanding whilst using AI for personalisation. These findings align with Hashim et al.'s (2022) research on personalised learning, showing how educators balance individualisation with collaborative learning needs. Arts educators emphasised preserving spontaneity and creative development (Participant 7), demonstrating the importance of maintaining comprehensive educational experiences alongside AI-enhanced personalisation. This perspective suggests that successful AI integration depends on thoughtful implementation that preserves personalised learning opportunities and broader educational goals.

6.3. Research Questions' Findings

Analysis reveals significant interconnections between the identified themes. The concern for maintaining critical thinking directly relates to the risk of over-reliance on AI, suggesting these issues must be addressed concurrently. The theme of changing educator roles interconnects with the need for enhanced professional development and ethical guidelines, indicating that successful AI integration requires a comprehensive approach to addressing multiple challenges simultaneously.

The results signify a complicated transformation that influences multiple aspects of the educational process that emphasises three critical areas: the evolution of educator roles, the tension between personalisation and comprehensive education, and the need for discipline-specific approaches to AI integration. The findings demonstrate how AI can improve educational approaches through thoughtful implementation considering pedagogical and technological dimensions.

7. Implications and Recommendations

The thematic analysis revealed five areas that reflect the complex nature of AI integration in education: academic integrity, administrative efficiency, data-driven insights, personalised learning, and ethical considerations. Based on these findings, the following sections present recommendations organised into four domains: curriculum development and professional training, policy and ethical guidelines, implementation strategies and stakeholder engagement, and future directions.

The recommendations presented in the following sections align with Chan's (2023) multidimensional AI policy framework, which proposes addressing AI integration through pedagogical, governance, and operational dimensions. Each dimension requires specific stakeholder involvement—teachers leading pedagogical implementation, senior management establishing governance protocols, and technical staff ensuring operational effectiveness.

7.1. Curriculum Innovation and Professional Development

Educational institutions should develop systematic AI literacy programmes across all levels whilst creating discipline-specific assessment methods that preserve critical thinking. The arts education perspective highlighted how creativity and collaborative learning skills remained distinctly human-centred (Participant 7), reinforcing the need for a balanced curriculum design. Science educators emphasised using AI to enhance rather than replace fundamental understanding (Participant 2).

Professional development requires a substantial investment for effective AI integration. The 'Changing Educator Roles' theme emerged strongly across participant responses, highlighting the need to balance AI efficiency with personal engagement. Educators stressed that professional development should focus on AI as an enhancement

rather than replacing existing teaching methods (Participant 4). Science education revealed concerns about balancing technological support with analytical skill development (Participant 3).

7.2. Policy and Ethical Guidelines

Policy reform requires reassessing regulations related to academic integrity, evaluation methods, and technological applications. All seven educators expressed concerns about verifying and authenticating student work in an AI-enhanced environment. Policy changes must focus on balancing technological integration with academic standards, developing frameworks that address AI-generated content, protecting data privacy, and maintaining assessment integrity.

Ethical guidelines must address data protection, AI-generated content ownership, and ethical considerations whilst aligning with fundamental academic values. Concerns about academic integrity emerged regarding AI's accessibility (Participant 6). The challenge of distinguishing between appropriate AI assistance and over-dependence in student work was a primary concern (Participant 5), whilst science educators emphasised the need for clear guidelines about AI's role in problem-solving (Participant 3).

7.3. Implementation Strategy and Stakeholder Engagement

Working across subject boundaries proves essential when tackling the complex challenges identified in this research. Partnerships between educational professionals and AI developers play an important role in maintaining human engagement in learning environments. A fundamental challenge emerged in reconciling different perspectives between science and arts education (Participant 3), where priorities regarding algorithmic processes and student engagement often conflict.

Continuous engagement among diverse stakeholders will influence an educational future that effectively harnesses AI capabilities whilst maintaining educational principles. Institutions should establish regular consultation processes, create comprehensive feedback mechanisms, and develop clear communication channels between educators and AI developers.

7.4. Future Directions

Research must prioritise the balance between AI assistance and developing critical thinking and independent learning skills, a concern expressed by all participants. Educators emphasised understanding AI's developmental effects over extended periods (Participant 4), tracking student progress from first year to completion. The complexity of such research presents challenges in maintaining methodological consistency as AI technology evolves.

Education's future will blend AI-enhanced and traditional learning experiences. Institutions should establish pilot programmes testing different levels of AI integration, develop flexible frameworks based on subject requirements, and create mechanisms for continuous evaluation. This includes collecting feedback from students and educators, evaluating learning outcomes, and monitoring the balance between AI-enhanced and traditional pedagogies.

8. Conclusion

This study explored educators' perspectives on AI integration in higher education, focusing on decision-making processes and personalised learning. Through semi-structured interviews with seven experienced educators, the research revealed how AI transforms educational practices whilst preserving essential human elements.

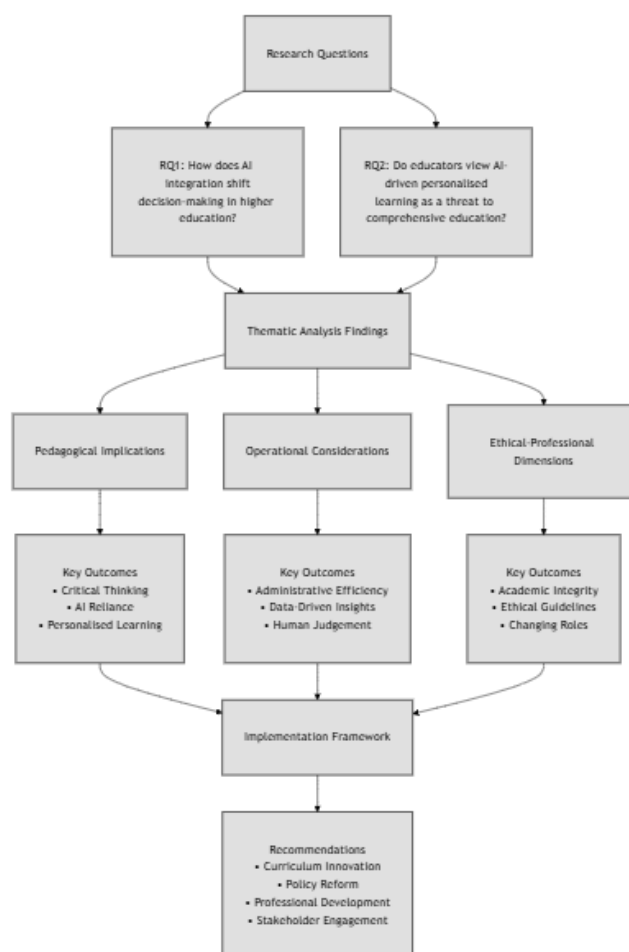


Figure 1: Research Framework for AI Integration in Higher Education: From Questions to Implementation

The framework illustrates the systematic progression of the research, beginning with the research questions about decision-making shifts and personalised learning. The central elements—pedagogical implications, operational considerations, and ethical-professional dimensions—inform the key outcomes and implementation recommendations. The interconnected structure shows how these elements work together to guide AI integration whilst maintaining educational quality.

Addressing RQ1, the findings demonstrate that AI integration creates a hybrid decision-making model where AI handles routine administrative tasks whilst educators maintain authority over crucial pedagogical choices. This balance allows educators to focus on interpretative and qualitative judgements that require human insight and experience.

For RQ2, educators view AI-driven personalised learning not as a threat but as a tool requiring thoughtful implementation. The main concern centres on maintaining a balance that preserves critical thinking and comprehensive educational values, emphasising the irreplaceable human elements of education—emotional intelligence, spontaneity, and ethical judgement.

The findings' analysis discovered five interconnected domains: curriculum innovation, ethical guidelines, interdisciplinary collaboration, policy reform, and professional development. Addressing these domains requires participation and carefully structured planning efforts from all relevant parties. A recurring difficulty emerged from the research: bridging the gap between contrasting academic values—where technical accuracy dominates scientific fields whilst expressive creativity guides artistic domains. This disconnect highlights why stronger cross-disciplinary dialogue must be established.

As AI technology rapidly advances, regular evaluation becomes necessary to account for emerging capabilities. Future research should explore the extended impact of AI implementation, methods for fostering collaboration across academic disciplines, and longitudinal studies of student development in AI-enhanced learning environments. Clear frameworks must balance AI assistance with human judgement, supported by robust ethical guidelines that protect academic integrity.

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Components and Indicators of Essential Future Work Skills for Teachers in the Sarasas Affiliated Schools: A Confirmatory Factor Analysis

Sittiratch Leeloun¹, Nipitpholt Sanitlou²

^{1,2} Department of Education Administration, Faculty of Education, Sarasas Suvarnabhumi Institute of Technology, Thailand

Correspondence: Sittiratch Leeloun. E-mail: saphteacher@gmail.com

Abstract

In an era of rapid technological advancement and evolving educational landscapes, developing essential skills for future educators is vital for fostering effective and innovative teaching. This study examines the components and indicators of essential future work skills for teachers in Sarasas Affiliated Schools by developing and validating a competency structural model through Confirmatory Factor Analysis (CFA). A quantitative research design was employed, surveying 390 teachers from 45 Sarasas schools using a questionnaire with 101 indicators categorized into five core skill domains: (1) Communication and Digital Literacy, (2) Self-Management, (3) Creative Thinking, (4) Social and Emotional Skills, and (5) Leadership. The findings reveal that each domain significantly contributes to the overall competency framework, with self-management identified as the most critical skill, enabling teachers to adapt effectively to educational changes. The study highlights the need for educators, administrators, and professional development agencies to integrate these skills into teacher training programs to meet 21st-century demands. Key findings include: (1) Essential future work skills comprise five primary components, 21 sub-components, and 101 indicators; (2) The structural model demonstrated strong empirical alignment, with statistical measures confirming its validity: Chi-square (χ^2) = 154.94; df = 152; P-value = 0.41843; GFI = 0.96; AGFI = 0.95; RMSEA = 0.007; CN = 390. This validated model offers a practical framework for developing teacher competencies, serving both as a guide for professional growth and as an effective assessment tool for future-ready educators.

Keywords: Future Work Skills, Teacher Competency, 21st-Century Education, Digital Literacy, Professional Development

1. Introduction

The 21st-century education system is undergoing significant transformations due to advancements in technology, society, and the economy, necessitating teacher adaptability to prepare students for future workforce demands.

Teachers' roles now extend beyond imparting academic content; they must foster critical thinking, digital literacy, creativity, self-management, and leadership skills.

International educational frameworks—including OECD (2021), World Economic Forum (2020), and UNESCO (2019)—emphasize teacher skill development, particularly in technological adaptation, lifelong learning, and educational leadership, as essential factors in preparing students for the future.

In Thailand, Sarasas Affiliated Schools play a pivotal role in primary and secondary education. Enhancing teachers' skills to align with technological advancements and modern pedagogical approaches is imperative to ensuring effective knowledge transfer, promoting active learning, and maximizing student potential.

Thus, this study aims to develop a competency model of essential future work skills for teachers in Sarasas Affiliated Schools, serving as a guideline for evaluation, development, and professional enhancement in a rapidly evolving educational landscape.

2. Research Objectives

This study aims to examine the components and indicators of essential future work skills for teachers in Sarasas Affiliated Schools and to validate the structural competency model against empirical data. The specific objectives are as follows.

1. To analyze the structure and components of essential future work skills for teachers in Sarasas Affiliated Schools.
2. To develop a structural model of the components and indicators of teachers' future work skills.
3. To validate the alignment of the proposed structural model with empirical data.
4. To propose strategies for enhancing teachers' competencies to align with the future demands of the education system.

3. Conceptual Framework of the Research

This study aims to analyze the components and indicators of essential future work skills for teachers in Sarasas Affiliated Schools. To construct the conceptual framework, the researcher conducted an extensive review of theories, literature, and empirical studies, synthesizing relevant concepts into a structured framework. The framework consists of five core components and 21 sub-components, as illustrated in Figure 1.

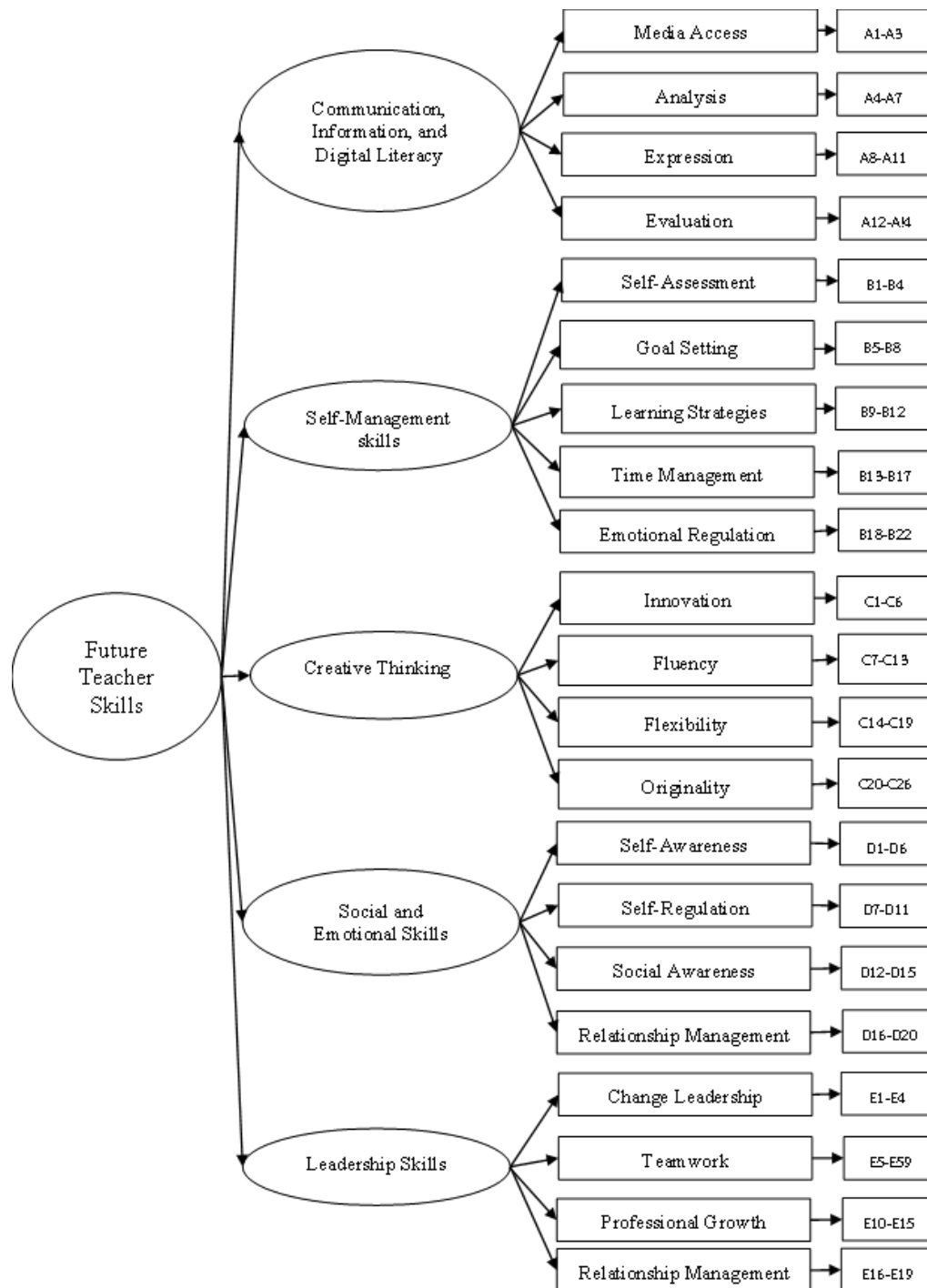


Figure 1: Conceptual framework for the research study.

4. Research Methodology

This quantitative study employs a survey-based approach and CFA (Confirmatory Factor Analysis) to develop and validate a future teacher competency model.

Study Phases

Phase 1: Development of Skill Indicators

- Literature review on teacher competencies and future work skills
- Identification of primary and sub-components
- Synthesis of 101 indicators

Phase 2: Model Validation

- Population: 4,799 teachers across 45 Sarasas Affiliated Schools
- Sample: 390 teachers selected via multi-stage sampling (based on Hair et al. (2010) recommendations)
- Research Instrument: Likert-scale questionnaire (5-point scale)
- Reliability Testing: Cronbach's Alpha = 0.98 (high reliability)
- Data Analysis: CFA using LISREL and SPSS
- Model Validation Criteria: Chi-square/df < 2, GFI & AGFI > 0.90, RMSEA < 0.08

Table 1: Summary of Model Fit Criteria

Model Fit Statistics	Acceptance Criteria
Chi-square (χ^2)	χ^2 that is not significant, or p-value > 0.05, indicates model fit.
Goodness-of-Fit Index (GFI)	A value between 0.90 – 1.00 indicates a well-fitting model.
Adjusted Goodness-of-Fit Index (AGFI)	A value between 0.90 – 1.00 indicates model fit.
Root Mean Square Error of Approximation (RMSEA)	A value below 0.05 indicates good model fit.
Critical N (CN)	A value greater than 200 is considered acceptable.
Factor Loading of Primary Components	A value of 0.70 or higher is acceptable.
Factor Loading of Subcomponents and Indicators	A value of 0.30 or higher is acceptable.

5. Research Summary

This study aimed to examine the components and indicators of essential future work skills for teachers in Sarasas Affiliated Schools and to validate the structural model against empirical data. The research utilized a sample of 390 teachers from 45 Sarasas schools, employing Confirmatory Factor Analysis (CFA) for data analysis.

5.1 Components and Indicators of Essential Future Work Skills for Teachers

The findings confirm that the identified components and indicators are appropriate, classifiable into five core components, 21 sub-components, and a total of 101 indicators, all demonstrating high average scores across all domains.

5.1.1 Communication, Information, Media Literacy, and Technology Skills

- Includes 4 sub-components and 14 indicators, covering media access, analysis, interpretation, and evaluation.

5.1.2 Self-Management Skills

- Consists of 5 sub-components and 22 indicators, encompassing goal setting, time management, and self-regulation.

5.1.3 Creative Thinking Skills

- Comprises 4 sub-components and 26 indicators, addressing innovation, flexibility, and problem-solving.

5.1.4 Social and Emotional Skills

- Encompasses 4 sub-components and 20 indicators, emphasizing emotional awareness, self-management, and relationship-building.

5.1.5 Leadership Skills

- Comprises 4 sub-components and 19 indicators, focusing on teamwork, change management, and professional development.

5.2 Factor Loadings of Indicators

Upon further analysis of the model (as shown in Table 43 and Figure 20), all 21 indicators demonstrated positive factor loadings ranging from 0.088 to 0.43, exceeding the acceptable threshold of 0.30. Additionally, all indicators were statistically significant at the 0.01 level. The ranking of key future work skills indicators, based on their factor loadings, is as follows.

- Self-Management Skills (SEL) = 0.99
- Leadership Skills (LEA) = 0.80
- Communication, Information, and Digital Literacy Skills (COM) = 0.76
- Creative Thinking Skills (CRE) = 0.67
- Social and Emotional Skills (EMO) = 0.57

Since second-order CFA does not report factor score coefficients, the researcher substituted the component weightings of the five skill domains to construct a scaled indicator model for essential future work skills for teachers in Sarasas Affiliated Schools.

According to Phetmanee Wiriyaueppong (2011, cited in Kaisit Pelarin, 2009, p. 243), these two values convey a similar conceptual meaning. Consequently, the structural equation model (SEM) for the future work skills indicators can be expressed as

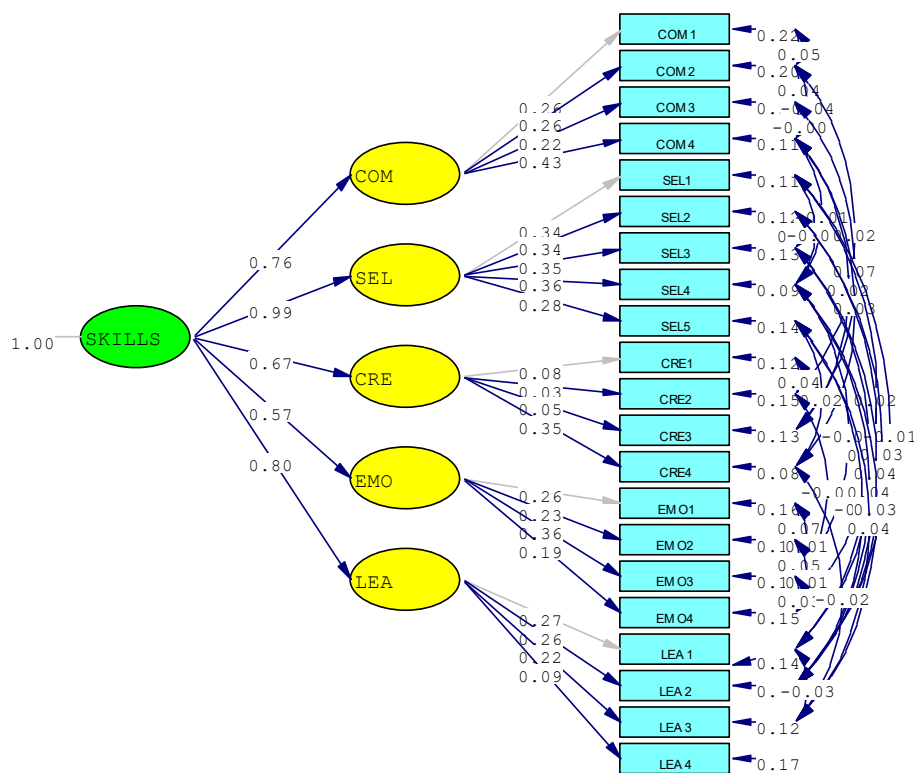
$$\text{SKILLS} = 0.76(\text{COM}) + 0.99(\text{SEL}) + 0.67(\text{CRE}) + 0.57(\text{EMO}) + 0.80(\text{LEA})$$

5.3 Results of the Second-Order Confirmatory Factor Analysis (CFA) of the Future Work Skills Model for Teachers in Sarasas Affiliated Schools

The second-order Confirmatory Factor Analysis (CFA) results indicate that the model exhibits excellent fit with empirical data, as evaluated by the following statistical indicators.

- Chi-square (χ^2) = 154.94, Degrees of freedom (df) = 152, P-value = 0.41843 (not statistically significant, indicating model fit).
- Chi-square/df = 0.96, which is below the threshold of 2, confirming good model fit.
- Goodness-of-Fit Index (GFI) = 0.96, meeting the acceptable benchmark (>0.90).
- Adjusted Goodness-of-Fit Index (AGFI) = 0.95, exceeding the required threshold (>0.90).
- Root Mean Square Error of Approximation (RMSEA) = 0.007, which is well below the standard cut-off of 0.08, signifying a strong fit.

These indicators support the acceptance of the primary hypothesis that the proposed research model aligns with empirical data.



Chi-Square=154.94, df=152, P-value=0.41843, RMSEA=0.007

Figure 2: Model of essential future work skills for teachers in Sarasas affiliated schools

4. Discussion

The findings of this study provide compelling insights into the essential future work skills required for teachers to thrive in an evolving educational landscape. By validating a structured competency model through Confirmatory Factor Analysis, this study establishes a robust framework that highlights the transformational role of self-management, communication, creativity, socio-emotional intelligence, and leadership in shaping teacher effectiveness.

4.1 The Primacy of Self-Management in Teacher Competency

One of the most striking results of this study is the overarching significance of self-management, which emerged as the most influential competency. This finding aligns with global workforce trends emphasizing adaptability, resilience, and lifelong learning as key attributes for professionals in the digital era (McKinsey, 2021). Teachers with strong self-regulation, goal-setting abilities, and emotional control are better equipped to handle the rapid transformations in pedagogical approaches, technological integration, and student engagement. The increasing emphasis on self-directed learning and flexible teaching strategies further reinforces the need for this competency.

4.2 The Integration of Digital Literacy and Communication

The study also confirms the critical role of Communication and Digital Literacy as an essential competency for modern educators. As classrooms become increasingly technology-driven, teachers must not only consume digital content but critically analyze, interpret, and create it to enhance student engagement and learning outcomes. This aligns with Trilling and Fadel's (2009) emphasis on digital fluency as a cornerstone of 21st-century teaching practice. The ability to effectively leverage digital platforms for instructional delivery is no longer an optional skill—it is fundamental to 21st-century teaching.

4.3 Creativity as the Catalyst for Innovation

Another major takeaway from this research is the vital role of creative thinking in effective teaching. The modern education system increasingly requires teachers to design innovative, flexible, and engaging learning experiences that accommodate diverse student needs. Creative problem-solving allows educators to develop adaptive instructional methods, foster critical thinking, and promote inquiry-based learning, preparing students for an unpredictable future. This finding resonates with the World Economic Forum's (2020) identification of creativity as a critical skill for future workforce development.

4.4 The Significance of Socio-Emotional Intelligence in Teaching

The findings underscore the importance of emotional and social intelligence as a key component of teacher competency, supporting Goleman's (1998) conceptualization of emotional intelligence in professional settings. Teachers who demonstrate high self-awareness, empathy, and interpersonal skills create positive, emotionally supportive learning environments that enhance student motivation, collaboration, and well-being. In the post-pandemic world, where students face increased anxiety and uncertainty, emotionally intelligent educators are instrumental in fostering resilience and social cohesion in classrooms.

4.5 Leadership as a Driver of Educational Transformation

Leadership skills were identified as another fundamental competency, emphasizing the need for collaborative decision-making, mentorship, and institutional leadership. This aligns with Fullan's (2020) work on leading in cultures of change. As education systems undergo rapid transformation, teachers who possess strong leadership capabilities are better positioned to influence policy, mentor peers, and drive curriculum innovation. The integration of leadership training into teacher development programs will ensure that educators are not just classroom managers but agents of educational transformation.

4.6 Implications for Policy and Professional Development

The results of this study provide a strategic blueprint for educational policymakers, administrators, and teacher training institutions. The integration of these competencies into professional development initiatives will empower teachers to navigate challenges, harness opportunities, and inspire student success.

To maximize impact, institutions should:

- Implement competency-based teacher training models that focus on self-management and leadership development
- Enhance digital literacy programs to equip educators with skills necessary for technology-integrated teaching
- Foster professional learning communities that encourage peer mentorship, collaboration, and innovation
- Prioritize emotional intelligence training to cultivate student-centered teaching approaches that foster well-being and engagement

By embedding these competencies into continuous professional development programs, educational institutions can future-proof their teaching workforce, ensuring that teachers are equipped not only to adapt to change but to lead the future of education.

7. Conclusion

This study establishes a structured competency framework that identifies and validates the essential future work skills required for teachers in Sarasas Affiliated Schools. Through Confirmatory Factor Analysis, the research confirms that Self-Management, Communication and Digital Literacy, Creative Thinking, Socio-Emotional Skills,

and Leadership are critical in shaping educators who are adaptable, resilient, and capable of navigating the rapidly evolving educational landscape.

Among these competencies, Self-Management emerged as the most influential, underscoring the importance of adaptability, emotional regulation, and lifelong learning in modern teaching. Additionally, digital literacy and creative problem-solving were identified as fundamental to fostering student engagement and innovation in pedagogy. The study also highlights the crucial role of emotional intelligence and leadership, ensuring that teachers not only facilitate learning but also inspire and lead within their institutions.

The findings of this study have significant implications for teacher training programs, educational policy, and professional development initiatives. As education continues to transform, this study serves as a strategic roadmap for ensuring that teachers are not just adapting to change but actively shaping the future of learning. Future research should explore longitudinal impacts of competency-based training programs and examine the integration of artificial intelligence and adaptive learning technologies in teacher competency development.

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Improving Students' Ability in Reading Descriptive Paragraphs Through Mind Mapping Technique

Elfrida BR. Silalahi¹

¹ English Diploma Department, Faculty of Social and Political, Merdeka University of Malang, Malang City, East Java 65146, Indonesia, email: elfrida.silalahi@unmer.ac.id. ORCID: <https://orcid.org/0009-0005-0004-1149>

Abstract

This study explores the effectiveness of the Mind Mapping technique in improving students' ability to read and comprehend descriptive paragraphs. Conducted in a classroom setting at SMP HKBP Padang Bulan Medan, Indonesia, the research used a mixed-methods approach, incorporating both quantitative and qualitative data collection techniques. The study revealed that Mind Mapping not only enhanced students' ability to understand the content of descriptive paragraphs but also increased their engagement and active participation in reading activities. The results provide compelling evidence of the benefits of Mind Mapping as an instructional tool to improve students' reading skills. This study suggests that visual representation of information using Mind Mapping techniques can aid enhance cognitive processing, making it an effective tool for English as a Foreign Language teachers who aim to improve their students' comprehension abilities.

Keywords: Descriptive Paragraphs, EFL Students, Mind Mapping, Reading Comprehension, Visual Learning Techniques

1. Introduction

1.1 Introduce the Problem

Reading is a crucial skill in learning any language, particularly in English, where students are required to comprehend a variety of texts for academic and personal purposes (Ali et al., 2022; Smith et al., 2021; Wilson, 2016). In Indonesia, many students face challenges when trying to read and understand descriptive paragraphs. Descriptive writing presents a unique set of difficulties, as it demands that readers visualize and retain intricate details about a subject (Abbas, 2021; Ningrum et al., 2023; Subandowo & Sárdi, 2023). For English as a Foreign Language (EFL) students, the need to comprehend these details while also understanding their relationship to one another can often be overwhelming. Without the proper strategy to manage this process, students frequently struggle to organize and recall key information effectively, making the comprehension of descriptive texts a challenge (Le et al., 2024; Mhlongo et al., 2023).

With the continuous expansion of education, new pedagogical methods with the potential of enhancing learners' reading comprehension play a vital role in supporting them to achieve educational success. They include the use of the Mind Mapping technique used to improve writing and cognitive ability but not frequently used to facilitate reading comprehension, particularly for description paragraphs. This research aims to explore the ability of Mind Mapping in improving the reading and comprehension ability of students in descriptive texts. There is a need to close this literature gap and study how visual aids like Mind Mapping can aid in the comprehension process by helping students better organize their knowledge and recall things.

Mind Mapping, originally developed by Tony Buzan in the 1970s, has been widely recognized for its potential in various educational settings, particularly in improving cognitive skills such as memory, creativity, and critical thinking (Buzan, 2006). Numerous studies have demonstrated the effectiveness of Mind Mapping in improving students' writing and organizational skills, as well as in fostering creativity in academic tasks (Karminah et al., 2017; Laila et al., 2023; Mustika et al., 2025). However, there is limited research on the application of Mind Mapping in improving reading comprehension, particularly about descriptive paragraphs.

Studies like those conducted by Yusrah and Fitria (2024) have shown that Mind Mapping aids in organizing ideas and improving creative thinking, yet most studies focus on writing skills or content creation rather than reading comprehension. This gap in the literature provides an opportunity to explore how Mind Mapping can be adapted as a reading strategy, particularly for EFL students who struggle with processing descriptive content. This research will investigate whether Mind Mapping can be used effectively to improve students' ability to read and understand descriptive paragraphs, addressing the existing gap in the literature.

1.2 Research Problem

The problem that this research aims to address revolves around the reading difficulties faced by EFL students, particularly in understanding descriptive paragraphs. This problem is critical to address now because as the educational landscape grows increasingly digital and information-heavy, students must develop stronger reading skills to navigate a variety of academic texts. The challenges of reading comprehension have become even more pronounced as students are exposed to larger volumes of information in a variety of formats (Jensen et al., 2024; Smith et al., 2021).

There are several reasons why this research is necessary. The need to improve students' reading comprehension has become more urgent as they are increasingly required to engage with complex academic materials that often include descriptive and detailed information (Alghonaim, 2020). Additionally, the rapid advancement of technology in education necessitates innovative teaching strategies that can help students process and retain information effectively (du Plooy et al., 2024; Haleem et al., 2022).

By improving students' ability to comprehend descriptive texts, this research has the potential to enhance their academic performance, leading to better educational outcomes. Additionally, Al Roomy (2022) state that stronger reading skills will benefit students in their professional lives, as the ability to process and understand detailed information is essential in a wide range of fields.

This study contributes to reading comprehension strategy literature, by examining the lesser-explored area of Mind Mapping and its impact on reading comprehension of descriptive paragraphs. The findings would have pedagogical implications and provide new insight into the use of visual aids to facilitate comprehension in the EFL classroom.

While many studies have been conducted on the efficacy of Mind Mapping in writing and brainstorming, there are few studies conducted on how it can be utilized in reading comprehension, especially in descriptive text. This study bridges this gap by investigating the utilization of Mind Mapping to help EFL learners improve their reading proficiency through descriptive paragraphs.

The study will provide valuable insights into how Mind Mapping can facilitate reading comprehension by visually organizing information, which may lead to new approaches to teaching EFL students. Additionally, the research will explore the specific benefits of Mind Mapping in understanding detailed and descriptive information, offering a fresh perspective on reading instruction strategies.

1.3 Research Focus

This research focuses on the effectiveness of the Mind Mapping technique in improving the reading comprehension of descriptive paragraphs among EFL students. The study will examine how Mind Mapping can help students identify key details, understand the relationships between them, and synthesize the information in a coherent manner. The focus is specifically on descriptive texts, which present unique challenges due to their detail-oriented nature.

1.4 Research Aim and Research Questions

The primary aim of this research is to assess whether the Mind Mapping technique can significantly improve students' ability to read and comprehend descriptive paragraphs. By integrating Mind Mapping into the reading process, the research seeks to determine if students can better organize and retain the information in descriptive texts.

The research questions that guide this study are: (1) How does the use of Mind Mapping impact students' ability to identify key details in descriptive paragraphs? (2) To what extent does Mind Mapping help students organize and synthesize the information presented in descriptive texts? (3) What are students' perceptions of Mind Mapping as a tool for improving their reading comprehension skills? (4) How does the improvement in reading comprehension through Mind Mapping affect students' overall academic performance?

1.5 Contribution to the Field

This study contributes to the field of language education by extending the use of Mind Mapping beyond writing and brainstorming to include reading comprehension. The results will provide valuable insights for EFL teachers seeking to improve students' reading skills, especially in the context of descriptive texts. By examining the potential of Mind Mapping to improve students' reading comprehension, this study highlights a novel approach to teaching reading that can be integrated into English language curricula.

2. Method

2.1 Research Design

The research was designed as a Classroom Action Research (CAR), a participatory and reflective approach that allows teachers to evaluate and improve their own teaching methods. CAR consists of iterative cycles of planning, action, observation, and reflection, which enable teachers to make adjustments based on the results of each cycle (Gogus, 2012). This method is particularly effective in educational research because it allows for continuous improvement and fine-tuning of instructional strategies based on real-time feedback.

2.2 Population and Sampling

The study was conducted with 20 eighth-grade students at SMP HKBP PADANG BULAN Medan, North Sumatera, Indonesia. These students were selected based on their challenges with reading comprehension, particularly with descriptive paragraphs. The small class size enabled the researcher to provide more personalized attention to students and conduct in-depth observations throughout the study.

2.3 Data Collection Instruments

Data for this study was collected through quantitative and qualitative measures. Quantitative data was collected through pre- and post-tests on the reading comprehension ability of students. The tests were designed to assess students' ability to pick out key details from descriptive paragraphs and organize the information in a coherent format. The qualitative data was collected through observation sheets, questionnaires, and diary entries. The observation sheets allowed the researcher to track students' performance and participation during the lessons, while the questionnaires captured students' attitudes towards the Mind Mapping approach. With the diary notes, the researcher commented on the teaching process and implemented adjustments as needed.

2.4 Data Analysis

The data collected in this study, both quantitative and qualitative, were analyzed using a descriptive technique. The quantitative data were derived from the pre-test and post-test scores of the students, while the qualitative data were obtained from observation sheets, questionnaires, and diary notes.

3. Results

3.1 Quantitative Data Analysis

The quantitative results collected from the pre-test and post-tests indicate a clear improvement in students' reading comprehension skills after the implementation of the Mind Mapping technique. The pre-test scores (Test I) provided baseline data, while the post-test scores from both Cycle I (Test II) and Cycle II (Test III) highlighted measurable growth in students' reading abilities (see Table 1).

Table 1: Displays the students' scores across all three tests.

Student's Initial	Test I (Pre-Test)	Test II (Post-Test Cycle I)	Test III (Post-Test Cycle II)
YS	50	55	63
HS	53	58	66
TT	55	62	69
NG	60	67	75
AA	64	69	77
KS	66	71	79
DH	66	71	81
DS	67	72	82
W	68	78	83
LB	68	78	83
AS	72	80	83
JD	75	80	83
CS	76	81	86
TS	79	84	89
BM	82	85	90
RH	82	85	90
JS	85	88	90
WM	88	91	93

As seen in the table, the students' scores improved progressively after each cycle. The average score of the class in the pre-test (Test I) was 69.65. After the Mind Mapping technique was introduced and applied in Cycle I, the class average increased to 74.95. The final post-test (Test III), conducted at the end of Cycle II, showed an even greater improvement, with an average score of 80.55. These improvements reflect a significant enhancement in students' reading comprehension of descriptive paragraphs.

In addition to individual score improvements, the percentage of students meeting the minimum mastery score (KKM) of 75 increased from 40% (8 students) in the pre-test to 55% (11 students) in the first post-test (Cycle I) and reached 80% (16 students) in the final post-test (Cycle II).

3.1 Qualitative Data Analysis

Qualitative data were gathered through observation sheets, questionnaires, and diary notes. These data provided valuable insights into students' engagement, perceptions, and attitudes toward the Mind Mapping technique.

The observation sheet revealed that students were more active and engaged in the reading process when Mind Mapping was applied. In the initial phase of the study, many students appeared passive and hesitant to contribute during reading activities. However, after being introduced to the Mind Mapping technique, students showed increased enthusiasm. They actively participated in group discussions and were more confident in expressing their thoughts and ideas about the descriptive paragraphs they read.

The researcher's diary entries captured the same finding. Initially, students could not understand the form of descriptive paragraphs. But while practicing to create Mind Maps further, they could arrange their ideas better. They also felt more in control of the information and more capable of linking ideas. Some of the students reported that the Mind Mapping technique helped them visualize and organize the descriptive details, hence easier to understand the content of the paragraphs.

The survey administered at the end of Cycle II reflected overwhelmingly positive responses from the students. When questioned if they had found Mind Mapping helpful in improving their reading comprehension, 75% of the students agreed, and 56% strongly agreed. Most of the students reported that the method helped them identify key ideas and organize the information in a logical sequence, which helped them better understand the descriptive texts.

4. Discussion

The results of this study confirm that Mind Mapping is an effective technique for improving students' reading comprehension of descriptive paragraphs. The significant improvement in both quantitative scores and qualitative feedback suggests that Mind Mapping not only enhances students' ability to identify key details in a text but also encourages them to organize and synthesize this information more effectively.

One of the most significant findings of this study is the positive effect of visual learning on reading comprehension, particularly through the use of Mind Mapping. Visual learning, as supported by dual-coding theory (Paivio, 2006), suggests that information presented in both verbal and visual formats enhances learning by engaging different cognitive pathways. Mind Mapping, as a visual tool, helps students break down complex information into more manageable chunks. It allows learners to visually organize and structure information, which aids in memory retention and comprehension by facilitating better encoding of information. By creating a diagram that connects key ideas and details, students are better able to understand how different pieces of information are related to one another. This concept aligns with cognitive load theory (Barbieri & and Rodrigues, 2025; Chen et al., 2023), which posits that cognitive load is minimized when information is organized and chunked in a way that reduces unnecessary cognitive strain.

Furthermore, the application of Mind Mapping is particularly beneficial in understanding descriptive texts, where the details often need to be remembered and connected in a logical sequence. Descriptive texts require readers to grasp not only individual pieces of information but also how these details interrelate to form a cohesive understanding. By visualizing these connections, students can more easily recall and relate the specific details of the text. Additionally, Vygotsky's social constructivist theory supports this idea, emphasizing that learning is facilitated when students can interact with information in meaningful ways, such as through visual representation, which allows for more active engagement and deeper cognitive processing (Yaseen et al., 2025). Therefore, the

use of Mind Mapping enhances students' ability to comprehend, organize, and recall information, particularly in tasks that require connecting multiple details within a larger context.

As cognitive learning theories suggest, organizing information visually helps learners process and retain the material more effectively (AlShaikh et al., 2024; Castro-Alonso et al., 2021). In this study, Mind Mapping acted as a cognitive scaffold that allowed students to visually structure the information they were reading, making it easier for them to identify relationships between details and improve their recall of the material.

Another key finding is the increase in student engagement and motivation. In the initial stages of the study, many students appeared disengaged during reading activities. However, after incorporating Mind Mapping into the reading process, students became more actively involved in discussions and were more enthusiastic about reading. This aligns with Buzan, (2006), who argues that Mind Mapping not only enhances cognitive skills but also increases students' motivation by providing a creative and interactive way to engage with the material.

The use of Mind Mapping also encouraged students to think critically about the text. Instead of passively reading the material, students were encouraged to actively engage with it by identifying key ideas and organizing them in a meaningful way. This active engagement is crucial for developing strong reading comprehension skills, as it helps students build a deeper understanding of the content (Archila et al., 2024; Sagita & Sagita, 2024).

The collaborative nature of Mind Mapping further contributed to students' success in reading comprehension. During group activities, students were able to share their ideas and perspectives, which helped them gain a broader understanding of the text. Collaborative learning has been shown to enhance comprehension by allowing students to exchange ideas and clarify their understanding of the material (Mafarja et al., 2023, 2024). In this study, group work was particularly beneficial because it allowed students to work together to create a collective Mind Map, which reinforced their understanding of the descriptive paragraphs.

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School-Based Management Practices and Competence of School Principals: Implications for 21st Century School Leadership in Lanao del Sur

Sittienor C. Abubakar¹

¹ Department of Graduate Education, Graduate School Medina College, Ozamis City, Philippines

Correspondence: Sittienor C. Abubakar. E-mail: sittienorabubakar8@gmail.com

Abstract

This study assessed the school-based management (SBM) practices and competencies of school principals in Lanao del Sur Division, Philippines, aiming to develop a School-Based SBM Practices Enhancement Program. Specifically, it examined principals' profiles, competency levels based on NCBS-SH domains, SBM practice levels, and the relationships among these variables. Results revealed significant differences in principal competencies when grouped according to gender, with male principals assessed as more competent based on NCBS-SH standards. Significant differences were also found between the level of SBM practices and principal profiles, and between SBM practices and principal competencies. Key competency predictors included the domains of school leadership, creating a student-centered learning climate, and personal and professional attributes. Findings indicated principals aged 61 and above performed best in SBM practices, while those aged 41–50 performed least. Widowed principals exhibited the highest level of SBM practice, while married principals performed the least. Principals with doctoral degrees and extensive training experience demonstrated higher levels of SBM practice. Based on these findings, it is recommended that principals enhance their management skills, communicate clear goals, and adopt effective leadership styles. Regular professional development and training should be prioritized to strengthen school leadership capacities. These results provide a guide for school heads and the Schools Division Office in designing targeted programs to improve principals' competencies and support effective school-based management for twenty-first-century educational demands.

Keywords: Educational Leadership, NCBS-SH, Philippines, Principal Competency, Professional Development, School Leadership, School-Based Management, Twenty-First Century Skills

1. Introduction

Despite sustained efforts by governments and international agencies to improve educational systems, many learners—particularly those from disadvantaged, indigenous, or marginalized communities—still face limited access to quality education. Global initiatives such as Education for All and the Millennium Development Goals

(MDGs) have attempted to address these disparities by increasing funding and attention to low-income nations. However, access alone does not guarantee quality. International assessments such as TIMSS, PIRLS, and PISA consistently show underperformance among students in developing countries. Hanushek and Woessmann (2007) argue that without meaningful institutional reforms, simply increasing resources will not yield improvements in equity or learning outcomes.

Many countries have adopted School-Based Management (SBM), a governance model that decentralizes decision-making authority to schools and their communities to address quality concerns and enhance system responsiveness. SBM empowers school heads, teachers, parents, and other stakeholders to participate in planning, budgeting, and school improvement processes. The rationale behind SBM is that shared governance leads to more context-sensitive, responsive, and effective educational outcomes (Lewis, 2006; Leithwood & Menzies, 2008). High-performing countries in the OECD, for instance, demonstrate that giving schools autonomy over curriculum, personnel, and resources can significantly enhance both accountability and student achievement (OECD, 2014).

In the Philippines, the Department of Education (DepEd) has institutionalized SBM as part of its broader Basic Education Sector Reform Agenda. The implementation of SBM is guided by the SBM Framework and supported by the Revised School-Based Management Manual in 2015. DepEd's purpose is to cultivate a participatory culture in schools where stakeholders work collaboratively to deliver quality and inclusive education. Key to this effort are school principals who serve as transformational leaders tasked with managing instructional programs, engaging stakeholders, and ensuring effective school operations. As such, principals must demonstrate a high level of competence aligned with the National Competency-Based Standards for School Heads (NCBS-SH), which outlines essential leadership domains such as instructional leadership, school management, and stakeholder engagement.

In the Division of Lanao del Sur, SBM implementation has been underway for several years. However, concerns remain regarding the extent of its effectiveness and sustainability. While DepEd has mandated regular SBM assessments, there is limited empirical evidence on how principals' competencies influence the quality of SBM practices, particularly in conflict-affected and resource-challenged regions like Lanao del Sur. Understanding these relationships is critical for determining where schools should focus their efforts to move toward mature levels of SBM.

This study, therefore, aims to assess the level of SBM practices and principal competencies in the Division of Lanao del Sur, Philippines. It also seeks to determine the relationship between school heads' profiles, their competencies as measured by NCBS-SH, and their SBM implementation practices. In essence, the study intends to identify the key competency predictors of effective SBM and use these findings as a basis for proposing a School-Based Management Practices Enhancement Program tailored to the needs of the region.

2. Method

This section presents the methodology employed in the conduct of the study. It outlines the research design, respondents of the study, research instruments used, procedures for data collection, and the statistical treatments applied.

2.1 Research Design

This study employed a descriptive-correlational quantitative research design. It sought to describe the profile and competencies of school principals, assess the level of SBM practices, examine the relationships among these variables, and determine the competency predictors of SBM practices. The findings were also used as the basis for proposing a School-Based Management Practices Enhancement Program. A descriptive-correlational design is used to examine and describe the relationships between variables without attempting to infer a causal relationship (Devi et al., 2022). This design is appropriate for the study because it allows the researcher to systematically describe the current status of the school principals' profiles, competencies, and SBM practices, as well as to identify significant associations and predictive relationships among these variables. Furthermore, the design enables the

formulation of evidence-based interventions, such as an enhancement program, grounded in the statistical patterns and relationships observed in the data.

2.2 Research Respondents

Using purposive sampling, 60 school principals from the Division of Lanao del Sur were selected as respondents for this study. They were chosen because they could be easily identified and were readily available. The respondents assessed themselves using the NCBS-SH Self-Assessment Tool and the SBM Assessment Toolkit. Table 1 below shows the distribution of respondents according to congressional district and sex.

Table 1: Distribution of Respondents by Congressional District and Sex

Respondents	Male	Female	Total
District I	15	15	30
District II	18	12	30
Total	33	27	60

The table shows that the two congressional districts had an equal total number of respondents. In District I, male and female school principals were equally represented. In District II, however, there were more male than female school principals.

2.3 Research Instruments

This study utilized a questionnaire based primarily on the National Competency-Based Standards for School Heads (NCBS-SH), which outlines a set of competencies anchored on the core values of Filipino school leaders and key principles of effective school management. The NCBS-SH comprises seven (7) domains: (1) school leadership; (2) instructional leadership; (3) creating a student-centered learning climate; (4) HR management and professional development; (5) parent involvement; (6) school management and operations; and (7) personal and professional attributes and interpersonal effectiveness, each of which contains specific standards of expected performance. These standards are translated into observable indicators that reflect the quality and effectiveness of a school head's leadership and management practices.

In addition, the School-Based Management (SBM) Assessment Tool was employed to assess the level of SBM practice in schools. This tool consists of six (6) dimensions, each focusing on a major area of school governance and operations: (1) School Leadership, (2) Internal Stakeholders, (3) External Stakeholders, (4) School Improvement Process, (5) School-Based Resources, and (6) School Performance Accountability. These dimensions provide a comprehensive framework for evaluating the degree of SBM implementation in basic education institutions.

2.4 Data Gathering Procedure

A written request for permission to conduct the study was sent to the Schools Division Superintendent of the Division of Lanao del Sur, as well as to the school principals within the division. At the beginning of the research, the school principals were asked to fill up the information sheets reflecting their profile, such as name, age, gender, civil status, length of teaching service, educational attainment, and training attended. After the respondents filled up the teacher profile, they proceeded to answer the NCBS-SH Self-Assessment Tool and the SBM Level of Practices Assessment.

2.5 Statistical Treatments

To test the hypotheses formulated, the following statistical tools were used in the study:

- Frequency and percentage were used to determine the distribution of the school principals' profiles, while the mean was used to obtain the average rating of the school principals' competencies/performance.

- Z-test and F-test were used to determine the significant differences in the competencies of school principals when grouped according to age, gender, civil status, length of teaching service, educational attainment, and training attended.
- A simple mean was used to identify the competency predictors of SBM practices.
- Other statistical tools, such as mean, standard deviation, and variance, were employed to supplement the main analyses.

3. Results and Discussion

This section presents the results obtained from the collected data and the subsequent analyses in a sequence corresponding to the problems presented.

3.1 Profile of the School Principals

Table 2: Profile of the School Principals in Lanao del Sur

Profile		No. of School principals	Percentage
Age (Years)	21-30	0	0%
	31-40	15	25%
	41-50	21	35%
	51-60	17	27.5%
	61-70	7	12.5%
Gender	Female	27	45%
	Male	33	55%
Civil Status	Single	3	5%
	Married	49	82.5%
	Separated	0	0%
	Widow	8	12.5%
Length of Service (Years)	10 and below	27	45%
	11-20	13	22.5%
	21-30	12	20%
	31 and above	7	12.5%
Educational Qualification	Bachelor	0	0%
	Bachelor w/ MA Units	17	27.5%
	Masteral	28	47.5%
	Masteral w/ Doctoral Units	10	17.5%
	Doctoral	5	7.5%
Number of Trainings	5 and below	29	47.5%
	6-10	21	35%
	11-15	6	10%
	16-20	5	7.5%

Table 1 above presents the profile of school principals in Lanao del Sur. A total of 60 school principals participated in the study. Of this number, 35% were aged 41 to 50 years old, followed by 27.5% aged 51 to 60 years old. 25% were in the 31 to 40 age range, 12.5% were aged 61 to 70, and 0% belonged to the 21 to 30 age range. Of the 60 school principals, males outnumbered females, with 58.33% male and 41.67% female respondents. The data also show that the majority (82.5%) of the school principals were married; 12.5% were widowed, 5% were single, and 0% were separated.

In terms of length of service, 45% of the principals had 10 years or less of service; 22.5% had served 11 to 20 years; 20% had 21 to 30 years of service; and 12.5% had served for more than 31 years. Regarding educational qualifications, 47.5% were master's degree holders, followed by 27.5% who held a bachelor's degree with MA units. Additionally, 17.5% held a master's degree with doctoral units, while 7.5% were doctoral graduates. None of the respondents held only a bachelor's degree. Further, in terms of professional development, 47.5% have attended five or fewer training courses over the last two years. 35% attended six to ten training courses, 10% attended eleven to fifteen training courses, and 7.5% attended sixteen to twenty training courses.

3.2 Level of School Principals' Competence Based on NCBS-SH Domains

Table 3: Average of School Principals' Competency Distributions in the NCBS-SH Domains

NCBS-SH DOMAINS	AVERAGE		Interpretation
1. School Leadership	3.05	76.16%	Expert
2. Instructional Leadership	2.93	73.24%	Practitioner
3. Creating a Student-Centered Learning Climate	3.05	76.13%	Expert
4. HR Management and Professional Development	2.91	72.78%	Practitioner
5. Parent Involvement and Community Partnership	2.96	74.11%	Practitioner
6. School Management and Operations	3.00	74.96%	Practitioner
7. Personal and Professional Attributes and Interpersonal Effectiveness	3.25	81.17%	Expert
AVERAGE	3.02	75.50%	Expert

Table 3 presents the average competency ratings of school principals across the seven domains of the National Competency-Based Standards for School Heads (NCBS-SH). The overall average competency level was 3.02, which corresponds to 75.50%, interpreted as "Expert". This suggests that, on average, school principals in the study demonstrate a high level of proficiency in the competencies expected of school leaders.

Among the seven domains, *Domain 7: Personal and Professional Attributes and Interpersonal Effectiveness* recorded the highest average rating of 3.25 (81.17%), interpreted as "expert" which indicates that principals exhibit strong values, ethics, interpersonal skills, and professionalism—core traits necessary for effective school leadership. The domains of *School Leadership* and *Creating a Student-Centered Learning Climate* both received an average rating of 3.05, interpreted as "expert", indicating strong leadership skills in guiding the school's vision and fostering a positive and inclusive learning environment.

On the other hand, five domains fell under the "practitioner" level of competence. *Instructional Leadership* was rated at 2.93 (73.24%), suggesting that while principals are competent in guiding instructional practices, there is room for growth in curriculum supervision, teaching quality monitoring, and instructional support. Similarly, *HR Management* and *Professional Development* scored 2.91 (72.78%), highlighting a need for improved strategic planning in staff development and resource utilization. *Parent Involvement and Community Partnership* received a 2.96 (74.11%), suggesting moderate engagement with stakeholders and the community, which is crucial for the success of school-based management. *School Management and Operations*, rated at 3.00 (74.96%), also falls in the "practitioner" level, pointing to areas for enhancement in resource management, infrastructure oversight, and operational efficiency.

The data reveals that while principals exhibit expert-level competencies in personal and professional attributes, leadership, and learning climate development, improvement is still needed in instructional supervision, stakeholder engagement, and human resource management. These findings align with the literature that emphasizes the multidimensional role of school leaders, where instructional leadership, collaboration with stakeholders, and professional development are crucial factors in effective school governance (Mustari & Nurhayati, 2024).

Furthermore, the emphasis on interpersonal effectiveness and professional attributes as the highest-rated domain reinforces the assertion of Mehmood et al. (2023) that strong communication skills are central to a school leader's success. However, consistent with findings by Cansoy et al. (2024), without sufficient instructional and operational capacity, even highly personable leaders may struggle to sustain meaningful reforms.

3.3 Level of SBM Practices of the School principals

Table 4: Average of School Principals' Level of SBM Practices

NCBS-SH DOMAINS	AVERAGE		Interpretation
1. School Leadership	20	72.11%	Moving Towards
2. Internal Stakeholders	17	73.53%	Moving Towards

3. External Stakeholders	16	58.86%	Starting Stage
4. School Improvement	21	67.54%	Moving Towards
5. School-Based Resources	12	71.01%	Moving Towards
6. School Performance Accountability	15	65.19%	Moving Towards
AVERAGE	101	67.69%	Moving Towards

Table 4 presents the average scores of school principals in the six key dimensions of School-Based Management (SBM). The overall average rating was 101 points, equivalent to 67.69%, which falls under the "Moving Towards" level of practice. This implies that while the foundational structures and practices of SBM are present in schools, there is still a need for strengthening implementation to ensure sustainability and greater effectiveness.

Among the six dimensions, the highest rated was *Internal Stakeholders*, with a rating of 73.53%, interpreted as "Moving Towards". This suggests that schools are making progress encouraging participation among teachers, staff, students, and other internal actors in decision-making and school activities. *School Leadership* and *School-Based Resources* also recorded relatively high ratings of 72.11% and 71.01%, respectively, indicating growing capacity among school leaders in managing their schools and utilizing local resources to support school development.

The dimensions of *School Improvement* and *School Performance Accountability* received average ratings of 67.54% and 65.19%, respectively. These results reflect reasonable progress in establishing a culture of continuous school improvement and mechanisms for monitoring performance. However, these are still categorized as "Moving Towards", showing that schools are in the process of strengthening their planning, implementation, and evaluation systems, but have yet to institutionalize them fully.

Notably, the lowest rated domain was *External Stakeholders*, with a rating of 16 58.86%, which falls under the "Starting Stage". This indicates that partnerships with community members, local government units, non-government organizations, and other external partners are still in their early stages. This limited collaboration with external stakeholders may hinder the sustainability of programs and restrict schools from accessing additional resources and support from the community. As Cabardo (2016) and Lam-an (2023) noted, strengthening these external partnerships is important to developing a supportive environment that can enhance governance, curriculum development, accountability, and resource management within schools.

The overall interpretation of "Moving Towards" suggests that while SBM practices are gradually being adopted and applied by school heads, full institutionalization remains a challenge. These findings are consistent with the studies of researchers who noted that many public schools in developing regions demonstrate moderate implementation levels of SBM due to constraints such as insufficient training opportunities, limited stakeholder engagement, and challenges in resource mobilization (Villanueva & Ortega-Dela Cruz, 2022; Vernez et al., 2012).

3.4 Significant Relationships

Table 5: Significant Differences of the School Principals' Competencies When Grouped According to their Profile

Profile	Computed F Value	Table F Value	Decision
Age	1.0889	1.1644	Not Significant
Gender	0.51084	0.4258	Significant
Civil Status	0.9850	1.9157	Not Significant
Length of Service	1.6592	3.6370	Not Significant
Educational Attainment	4.2343	121.35	Not Significant
Trainings Attended	6.0463	10.1862	Not Significant

Table 5 presents the statistical results on whether there are significant differences in school principals' competencies based on their profile variables. Among the variables considered, *gender* was found to have a statistically significant difference in relation to the principals' competencies, as the computed F value (0.51084) was less than the table F value (0.4258), indicating significance. This finding suggests that gender may influence

how principals demonstrate or develop their professional competencies. It supports existing studies that highlight gender-based leadership differences in terms of leadership styles, with women often exhibiting more democratic, participative, transformational, and interpersonal approaches, while men tend to display assertive, formal, normative, and goal-oriented styles (Eagly et al., 1992, 2003 as cited in Lazaridou, 2024).

On the other hand, *age*, *civil status*, *length of service*, *educational attainment*, and *trainings attended* yielded computed F values that were greater than their respective table F values, leading to a decision of "Not Significant." This implies that there are no statistically significant differences in the competency levels of school principals when grouped according to these profile variables. These findings align with the study of Sawati et al. (2013), which argues that leadership competence may not be solely dependent on demographic background, but rather on specific skills and behaviors.

Table 6: Significant Differences of the Level of SBM Practices When School principals are Grouped According to their Profile

Profile	Computed F Value	Table F Value	Decision
Age	10.3408	4.4127	Significant
Gender	2.2953	2.1298	Significant
Civil Status	6.7240	4.4838	Significant
Length of Service	8.2534	4.1532	Significant
Educational Attainment	50.6035	40.8741	Significant
Trainings Attended	26.1186	11.5792	Significant

Table 6 presents the results examining whether the level of School-Based Management (SBM) practices significantly differs when school principals are grouped according to their profile variables. The computed F values for all six profile variables—*age*, *gender*, *civil status*, *length of service*, *educational attainment*, and *trainings attended*—were greater than their respective F critical values, indicating statistically significant differences in all categories. The findings suggest that each demographic and professional attribute of school principals influences their implementation of SBM practices to a significant degree. The findings were similar to the study of Vicera & Bentor (2022) which indicated that demographic factors of school heads, including marital status, may affect SBM implementation, with married principals showing higher levels of implementation.

Table 7: Significant Differences Between the School Levels of SBM Practices and School Principals' Competencies

	School principal Competencies	SBM Level of Practice
Mean	63.54027	75.50446
Known Variance	265.42	84.77
Observations	60	60
Hypothesized Mean Difference	0	
Z	-4.04354	
P(Z<=z) one-tail	2.63E-05	
z Critical one-tail	1.644854	
P(Z<=z) two-tail	5.27E-05	
z Critical two-tail	1.959964	
Decision	Significant	

Table 7 presents the results of a z-test for two independent means, examining the significant differences between the School-Based Management (SBM) level of practice and the competency levels of school principals. The computed z-value is -4.0435, which exceeds the critical z-value of 1.6449 (one-tailed) and 1.9600 (two-tailed). The associated p-values for both one-tailed (0.0000263) and two-tailed (0.0000527) tests are substantially lower than the standard significance level of 0.05, thus indicating a statistically significant difference between the two variables. The findings suggest that competent school principals are better equipped with skills and knowledge that enhance their ability to execute School-Based Management, leading to improved governance and school improvement outcomes. Similar to the study of Cabigao (2019) who assessed the professional competencies of school heads and their influence on school outcomes, organizational culture, and principals' performance. The

findings indicated that while leadership competencies did not significantly impact overall school outcomes, they did have a measurable effect on SBM practices.

3.5 Significant Competency Predictors of SBM Practices

The analysis revealed that three domains of school principals' competencies—*School Leadership, Creating a Student-Centered Learning Climate, and Personal and Professional Attributes and Interpersonal Effectiveness*—significantly predicted the level of School-Based Management (SBM) practices. These competencies were found to be positively associated with SBM performance, particularly in the SBM dimensions of school leadership, internal Stakeholders, and school-based resources.

The *School Leadership* domain emerged as a key predictor, underscoring the critical role of the principal in shaping the vision, direction, and overall governance of the school. This supports the findings of Punzalan (2024), who asserts that effective school leadership has a strong indirect effect on school improvement through its influence on teachers and school climate. In the context of SBM, the findings support the study of Ramos (2025) who found that leadership and governance scored the highest among SBM dimensions, indicating strong stakeholder participation in decision-making and accountability.

The domain of *Creating a Student-Centered Learning Climate* was also found to significantly influence SBM practices, suggesting that principals who promote inclusive, safe, and engaging learning environments are more likely to implement SBM effectively. As DepEd Koronadal City Division (2012) stated, shared decision-making and stakeholder engagement are crucial for effective school governance.

Moreover, the competency domain *Personal and Professional Attributes and Interpersonal Effectiveness* predicted higher levels of SBM practices, particularly in managing school-based resources and engaging internal stakeholders. This domain includes qualities such as emotional intelligence, ethical leadership, resilience, and effective communication—all of which enhance the principal's ability to build trust, resolve conflicts, and lead change. These findings resonate with the work of Bantolo & Arenga (2021), who emphasized strong interpersonal effectiveness for effective leadership and accountability.

3.6 Proposed School-Based Management Enhancement Program

Based on the findings of this study—particularly the observed gaps in the level of SBM practices and the influence of school leadership competencies—it is imperative to develop an intervention designed to enhance the competencies of school principals in implementing School-Based Management (SBM). In response, a Division-Wide Re-Orientation on School-Based Management Program is proposed.

This training program is aligned with the identified domains of the National Competency-Based Standards for School Heads (NCBS-SH) and is designed to directly address areas with lower proficiency levels, such as instructional leadership, stakeholder engagement, and operational management. The program also aims to reinforce strong areas such as personal and professional attributes and school leadership.

3.6.1 Objectives

The proposed SBM enhancement training seeks to:

1. develop skills in managing school to support student-centered, inquiry-driven management;
2. undertake extensive research on differential learning experiences which will provide the appropriate techniques for effective SBM practices;
3. encourage school principals to work in teams, solve problems, and participate in peer review of their SBM practices;
4. design SBM plans; and
5. engage school principals in hands-on school management and the creation of reliable evaluation tools.

3.6.2 Rationale

School principals are no longer merely sources of knowledge in school management but have become proactive facilitators who promote collaborative knowledge-building among stakeholders. They guide stakeholders to learn in diverse environments, navigate and process a wide array of information resources, and use these resources to solve problems and make informed decisions independently.

Many academic institutions in the country have recognized the need to redefine the role of school principals and have responded by launching professional development programs aimed at training them in School-Based Management (SBM). However, most of these training initiatives are short-term or “crash” programs that primarily focus on compliance literacy and do not sufficiently equip school principals to integrate SBM effectively into day-to-day school operations. Learning about SBM and its components may be relatively straightforward, but mastering its practical implementation is considerably more complex.

The quality of school leadership is widely recognized as a key predictor of school success. Therefore, comprehensive and sustained training for school principals is essential to ensure the effective implementation of SBM practices.

3.6.3 Training Design

The training program will be conducted at Compostela National High School Faculty Development Center, funded through the Division Fund, and will be delivered to all school principals in the Division of Lanao del Sur. The program will cover seven key areas aligned with the NCBS-SH domains as shown in the table below:

Table 8: Proposed SBM Enhancement Training Division-Wide Re-Orientation

Areas Of Concerns	Specific Objectives	Activities	Resources Needed	Expected Output
School Leadership	*Developing & Communicating the Visions, Missions, Goals and objectives	*School principals orientation in school management and activities	-LCD projector -SBM kit	*Enough Knowledge about school management
Instructional Leadership	*Developing Programs and adapting the existing programs	*program workshop *Team Building	-Lunch/ Snacks -LCD -Certificates	*Develop a research-based program
	*Monitoring the student achievements	*Retreat/ Recollection	-transportation -meals	*Awareness of student progress
Student-Centered Learning Climate	*Creating school environments focused on the needs of the learner	*recognition of high-performing students	-Instructional Materials -LCD -DVD	*Well organized Classroom instructions
	* Setting high social & Academic expectations	*workshop on school activities *Role Playing		*Supportive Management
Professional Development	*to develop professional learning community	*Seminar *Workshop	*Hand outs *LCD/DVD	*Building & Promoting Professionalism
Parent Involvement & Community Partnership	*to improve social skills, confidence and communication in	*Team Building *Film Showing of community Activities *Seminar	*Snacks/ Lunch *DVD Player *Props *Materials	*High Interpersonal Skills *High Social Skills

	relating with others			
School Management & Operations	*to develop managing school operations & fiscal management	*Training/ Workshop	*Workshop Materials *-DVD Player	*Strong establishment Of school operations
Personal, Professional & Interpersonal Effectiveness	*To develop commitment *to maintain Harmonious relationships	*Activities on Team Building *Retreat/ Recollection *Enhancement Training	*Handouts *Snacks/ Lunch	*Recognition of individual accountabilities

4. Conclusion

This study investigated the competency levels of school principals in Lanao del Sur based on the National Competency-Based Standards for School Heads (NCBSSH) and assessed their level of School-Based Management (SBM) practice. Findings revealed that the principals exhibited the highest competency in Domain 7: Personal and Professional Attributes and Interpersonal Effectiveness, followed by School Leadership and Creating a Student-Centered Learning Climate, all of which were interpreted as “Expert” levels. Meanwhile, competencies in other domains such as Instructional Leadership, HR Management, and Community Partnerships were generally rated as “Practitioner,” indicating room for development.

In terms of SBM practice, school principals were overall categorized as “Moving Towards” full implementation. Notably, the External Stakeholders domain was at the “Starting Stage,” suggesting limited engagement with the broader community—a critical element in effective decentralized school management.

Statistical analysis showed significant differences in principals’ competencies and SBM practices when grouped according to certain profile variables. Gender was found to significantly influence competency levels, while age, gender, civil status, length of service, educational attainment, and number of trainings attended were all significant factors affecting the level of SBM practice. Additionally, competencies in School Leadership, Creating a Student-Centered Learning Climate, and Personal and Professional Attributes were identified as strong predictors of effective SBM implementation.

In light of these findings, a Division-Wide SBM Enhancement Program was proposed. This program focuses on reorienting and developing the capacity of school heads through targeted training aligned with the identified competency gaps and practice needs. It emphasizes collaborative leadership, evidence-based decision-making, stakeholder engagement, and continuous professional development to ensure sustainable and effective SBM implementation.

Overall, the study underscores the important role of school leaders in driving school improvement through competent, inclusive, and responsive management practices. Investing in their continuous development through context-based training and leadership programs is key to achieving quality education outcomes in decentralized school systems.

Based on the conclusions established in the study, several recommendations are proposed to enhance the competencies of school principals and improve the implementation of School-Based Management (SBM). First, school principals should seriously reconsider their mastery of school management. This includes developing and communicating clear goals, making effective use of supervisory time, and selecting leadership methods and management styles that promote efficient and effective SBM. Second, school heads should be consistently updated on new school management methodologies to enhance their skills in implementing school-based programs and projects.

Furthermore, the results of this study should serve as a guide for school principals in designing and preparing relevant programs that support their professional development. Lastly, the Schools Division Office must recognize the urgent need for targeted training and enhancement programs aimed at uplifting the competencies of school principals, especially those who require further attention and support. School heads should also be encouraged to actively pursue continuous professional growth to ensure that they are capable of performing their responsibilities with greater efficiency and effectiveness in their respective areas of concern.

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Student Perceptions Related to Digital Games: A Phenomenological Analysis

Erol Koçoğlu¹, Ramazan Biçer², Türkan Dal Biçer³

^{1,2} İnönü University

³ Malatya Provincial Health Directorate

Abstract

The aim of this study is to determine the perceptions of 7th grade secondary school students about digital games. The study was designed in accordance with phenomenology design, one of the qualitative research approaches. A semi-structured interview form consisting of open-ended questions was used as a data collection tool. The study group of the research consisted of 50 secondary school 7th-grade students who were selected by simple random sampling method and who were continuing their education in two different secondary schools in Battalgazi district of Malatya province. The data collection tool prepared by the researchers was delivered to the students in the study group and necessary information about how to fill out the form was given. Care was taken to select the students in the study group on a voluntary basis and to avoid statements that could direct them. The data obtained from the research were analyzed with the content analysis technique. According to the results obtained, it was determined that students turned to digital games to have fun and relieve boredom, the content is very important in game selection, action, creativity, adventure and intelligence-strategy games are played more. In addition, it was determined that positive emotions such as happiness, excitement and fun, and negative emotions such as stress and greed were more prominent while playing games, and almost half of the students recommended playing digital games to their friends. The results obtained were discussed in line with the relevant literature and the study was concluded with recommendations.

Keywords: Game, Digital Game, Secondary School, Student, Phenomenology

1. Introduction

In Latin, all words related to play and games are expressed as "ludus" and "ludere". These words include children's play, relaxation, competition, ritual representations, in the general sense stage representations and games of chance (Huizinga, 2022). The Latin word "play" is essentially a very comprehensive umbrella term. While traditional gaming is a field that different disciplines are interested in, the discipline examining digital gaming is called "Ludology" (Binark & Bayraktutan- Sütçü, 2008; Bayzan & Güneş, 2022).

Play is the most indispensable part of childhood and plays an important role in children's development. From the past to the present, play has taken place in all communities from children to adults in order to fulfill various needs.

It can be stated that the game, which is a part of life, has undergone a change by being affected by changing living conditions (Toran et al., 2016; Yiğit Açıkgöz & Yalman, 2018; Biricik & Atik, 2021). In this sense, games have turned into digital games that are technology-based, supported by text and visuals, and integrated with new-generation entertainment software played with one or more people on computers or electronic media, consoles, mobile devices and smartphones (Dijital Oyunlar Raporu, 2020; Ilgaz & Abay, 2020; Baldemir & Övür, 2021). In particular, the increased use of smartphones in daily life leads the individual to become vulnerable to abuse by providing personalized usage areas. Although it is difficult to estimate the extent of the danger posed by smartphones regarding digital games, it can be stated that the situation will become clearer over time (Bayzan, 2022).

With digital transformation, technological devices have entered human life more, which has increased misuse and excessive internet use. Today, when everyone is a candidate for digital obesity, certain strategies should be developed for the use of digital devices (Koçoğlu et al., 2022). The use of digital technologies is one of the important steps of technological life and is a stepping stone to changing perceptions of play (Srai & Lorentz, 2019). Increased use of digital technology also leads to changes in the games played by children. Griffiths et al. (2012) and Kalınkara (2022) determined that digital games are in demand especially among young people, the tendency towards these games increases day by day and this causes addictions. Kuss and Griffiths (2012) and Surbakti et al. (2022) stated that digital games appeal mostly to children and adolescents and this group is more at risk for game addiction than other groups. Digital addiction arises as digital tools continue to be used despite the physical, mental, emotional, spiritual and social effects of excessive use of these tools on the individual (Bağımlılıkla Mücadele Alt Çalışma Alt Çalışma Grubu Raporu, 2018; Kesici & Tunç, 2018; Bhatiasavi et al., 2023; Akbaş & İşleyen, 2024). It can be stated that digital addiction is an important problem like addictions such as alcohol, drugs, gambling, etc. and disrupts the basic dynamics of society.

Digital games are popular entertainment tools and are played with different devices. Players can compete with themselves or electronic devices, or they can play these games online with people from different places (Green & McNeese, 2008; Griffiths et al., 2012; Cemiloğlu et al., 2022; Mestre-Bach et al., 2022). It has been determined that the level of playing games increases with peer interaction, which increases digital game addiction. It is seen that these games, which are constantly increasing in popularity today, have an important place in the lives of young generations and increase their addiction levels (Aleksić, 2018).

Digital games are entertainment tools that often have harmful aspects. Continuous gaming behaviors insensibly cause students' addictions and harm them. In this sense, digital game addiction leads to serious psychosocial health problems such as loneliness, depression and aggression (Jeong et al., 2017). It can be said that training provided by relevant individuals, institutions and organizations will be effective in increasing the awareness levels of individuals against digital dangers in relation to health problems. In this sense, it may be possible to prevent health problems by raising health literate individuals (Biçer & Biçer, 2024). Along with health problems, it is seen that different problems such as inability to use time effectively, economic problems, sleep disorder, laziness in non-gaming activities, eating disorders and excessive emotionality are also related to digital addiction (Widiyawati & Arby, 2022). Therefore, it is understood that digital game addiction first affects the individual and then the society negatively in terms of both mental and physical health, and therefore necessary measures should be taken.

It can be stated that digital games have beneficial aspects. These games enable individuals to make sense of the world and society, learn new skills by learning unfamiliar rules and situations. It can be stated that games played in a controlled manner increase social interaction, hand-eye coordination and imagination, amplify the ability to visualize in the mind, provide an advantage in problem solving and risk-taking, learning with peers and coping with disappointments. Besides, it can be said that, within the process, knowledge, experience and emotional connections related to the digital game will be increased, contributing to a rich texture of meaning and thus creating a deep and meaningful relationship that can shape one's actions, behavior and even identity. According to some parents, digital games also contribute to children's foreign language skills and education. To associate games with education, the potential of using "Minecraft Education Edition" (MEE), the educational version of "Minecraft", an open world game, was evaluated in terms of the formal education process. In this sense, it can be considered as an important development that Vocational and Technical Anatolian High Schools in Turkey designed game-learning

digital materials to be used in the field of Information Technologies (Green & McNeese, 2008; Granic et al., 2014; Irmak & Erdoğan, 2016; Eroğlu, 2019; Söğüt, 2020; Savaş et al., 2021; Meston et al., 2025; Sokka et al., 2025).

It can be said that changes in city structures, narrowing playgrounds, seasonal problems, increased dangers on the streets, and the increase in smartphone and internet use have a significant impact on the increase in digital game addiction in children (Biricik & Atik, 2021). Furthermore, during the Covid-19 pandemic that emerged in 2020, there was a significant increase in the use of digital devices due to changes in educational practices and increased remote connectivity. Therefore, it can be stated that digital addictions have increased and encouraging efforts to increase social awareness of healthy technology use have started to gain importance (Koçoğlu et al., 2024). In the same period, interest in digital games increased, and the number of people playing digital games exceeded 3 billion people in 2022. In 2025, this number is expected to reach 3.5 billion people (Dijital Oyun Bilgi Platformu, 2022). It can be stated that this number will increase day by day unless necessary measures are taken.

In the literature, there is a large number of studies (Griffiths, 2008; Griffiths et al., 2012; Xu et al., 2012; Griffiths, 2014; Griffiths et al., 2014; Novrialdy & Atyarizal, 2019; Kalınkara, 2022; Király et al., 2023; Kurt Topraklı & Kavlak, 2025) related to game addiction, internet addiction, internet gaming disorder, video game addiction, online game addiction, gaming disorder and digital game addiction. In addition, there are many studies on the perceptions of students at different levels regarding digital games in secondary school (Güvendi et al., 2019; Hazar et al., 2020; Küçük & Çakır, 2020; Talan & Kalınkara, 2020; Özdemir & Karaboğa, 2021; Çakır, 2022; Durak, 2023; Yunusoğlu, 2025), high school (Karabulut, 2019; Soyöz-Semerci & Balcı, 2020) and university (Pala & Erdem, 2011; Kesici & Tunç, 2018; Aktaş & Bostancı, 2021; Karabulut Coşkun & Akçay, 2023).

In this study, secondary school 7th-grade students' views on digital games were collected and evaluations were made. Although there has been an increase in the number of studies on the subject, no similar study on digital games has been found in literature. This shows that this study will contribute to literature and increase its importance.

1.1. Purpose of the Study

The aim of this study is to evaluate the perceptions of 7th-grade secondary school students about digital games from a phenomenological perspective. Within the framework of this general purpose, answers to the following questions were sought.

- Do you play digital games and why?
- When choosing the digital games, you play which feature of the game do you pay attention to and why?
- What digital game or games do you play? Please write their names.
- What are the emotions that come to the fore when you play digital games?
- Do you recommend digital gaming to your friends and why?

2. Research Methodology

2.1. Research Model

This research was conducted using qualitative research methodology. Qualitative research can be defined as a research method that designs data collections in the natural environment that is sensitive to people and places in research with both inductive and deductive methods, establishes patterns and themes, and includes data analysis. Qualitative studies, which are eventually turned into a written report, include the thoughts of the participants and the researcher, the interpretation of the problem, the contribution to literature or the call for change that they want to present (Creswell, 2020).

This research was conducted in accordance with phenomenology design. Yıldırım & Şimşek (2018) define this design as a design that focuses on phenomena that we are aware of but do not have an in-depth and detailed understanding. Merriam (2018) defines phenomenology as research that enables understanding the structure and essence of the phenomenon; Zahavi (2020) explains phenomenology as the science of phenomena or the studies

related to it and states that phenomenology is the study that makes a difference in the handling, analysis and interpretation of existing data. In this study, in line with the method of the research, phenomenology design was used to determine why secondary school 7th grade students play digital games, what they pay attention to when choosing games, which games they play, the types of games they play, the emotions they experience while playing games, and the reasons for recommending these games to their friends.

2.2. Working Group

After obtaining the necessary permissions for the study, the two schools named below were visited for the study. The study group of the research consisted of students from two different schools, Necip Fazıl Kısakürek İmam Hatip Secondary School and Rahmi Akıncı Secondary School in Battalgazi district of Malatya province. For the study, it was ensured that the research groups were close to each other in terms of academic level and socio-economic status. In this sense, class selections were made based on grade point averages and the opinions of classroom guidance counselors. The study group consisted of a total of 50 secondary school 7th grade students, 27 males and 23 females. The members of the study group, to whom the interview form was applied for the research, were selected by simple random sampling method from random sampling methods. Because determining the study group with this sampling method is more advantageous in terms of time and cost. From each of the two schools, 25 participants were selected from the class attendance records by simple random sampling method. All individuals in this sampling method had equal probability of being selected and the selection of one individual did not affect the selection of other individuals. The best and most valid way to select a representative sample is the random sampling method. Because it can be said that the simple random sampling method is more powerful than other methods in ensuring representation (Büyüköztürk et al., 2018).

2.3. Data Collection Tool

The data of the study were obtained through a five-question semi-structured interview form prepared by the researchers to determine the perceptions of secondary school students about digital games. The interview form was created by going through certain steps. Accordingly, the interview questions were prepared after a literature review and examined by two field experts. In line with the expert opinions, the form was finalized by evaluating the comprehensibility of the questions and their suitability for the purpose. A pilot study was conducted by applying the prepared form to the students at a secondary school different from the previously determined and researched schools. After the interview questions were verified, schools were selected for the research. As a result of the feedback obtained, the interview questions were finalized and data collection started. Thus, to obtain rich data from the study group, necessary information was given to the participants to go into detail, and it was tried to obtain the data in the desired direction. The required data for the study were obtained from the research questions directed to the study group within a plan. By this way, the data of the study were made ready for analysis.

2.4. Data Collection and Analysis

As stated before, the data of the study were obtained from 7th grade students attending Necip Fazıl Kısakürek İmam Hatip Secondary School and Rahmi Akıncı Secondary School in Battalgazi district of Malatya province in the second semester of the 2023-2024 academic year. The application of pilot study was carried out through the interview form which was created before the research was applied to 7th grade students attending Kurucaova Şehit Şeyho Kurtulmuş Secondary School in Doğanşehir district of Malatya province. As a result of the application, the necessary corrections in the interview form were made by the researchers and the form was finalized. After obtaining the necessary appointments and permissions from the schools, data collections were conducted at the selected schools the relevant schools. Before the interview began, the students were informed about the purpose of the research. Through semi-structured interview forms, students wrote the necessary data on the forms during one class hour in a conducive environment.

The data obtained from this study conducted with 7th grade students was analyzed using the content analysis technique. Content analysis is a technique that allows researchers to examine large volumes of data more easily in

a systematic way (Government Accountability Office (GAO), 1996). In content analysis, it is aimed to reach concepts and connections that can explain the collected data (Yıldırım & Şimşek, 2018). The data were coded and categorized appropriately by the researchers. According to the themes identified.

2.5. Validity and Reliability

To determine the validity and reliability of this study, internal and external validity were utilizing Miles and Huberman's (1994) formula. According to Yıldırım and Şimşek (2018), internal validity is the consistency of the researcher in the processes of data collection, analysis and interpretation during the research and to explain how this consistency is achieved. The semi-structured interview form was developed, guided by the opinions of two field experts to increase the internal validity of the research. To ensure the internal validity of the data obtained, a conducive environment was tested to provide the participants to answer the questions. Interviews were conducted after the participants felt ready and an atmosphere of trust was established. The data obtained from the interview form was reviewed and analysed. The themes, categories and codes created after the content analysis, were checked by submitting them for the opinion of a different field expert. After the findings were tabulated, direct quotations selected from the opinions of the participants were documented.

Yıldırım and Şimşek (2018) stated that external validity is expressed as the generalization of research results to similar environments and situations. To increase the external validity of the study, the data obtained were tried to be described in detail. The research process was reported as stages in a clear, plain and detailed manner. The research design, study group, data collection tools, data collection and analysis were explained in detail. The study group was selected from different classes and coded by hiding their real identities. Codes and categories were created through the interview documents, which were the main data source, then content analysis was done. To improve the quality of the research design, credibility and consistency were checked. In addition, Miles and Huberman's (1994) reliability formula ($\text{Reliability} = \frac{\text{Agreement}}{(\text{Agreement} + \text{Disagreement})}$) was used and it was determined that the agreement rate between the coders was 92%.

3. Research Results

In this section, the findings obtained through analyzing the data as a result of the research are presented. The findings obtained through the analysis of the data were presented in accordance with the sub-objectives of the research.

3.1. Students' Digital Game Playing Status

The first sub-objective of the study is to determine whether the participants play digital games. The question asked in line with this sub-objective "Do you play digital games and why?". The code table and frequency values of the responses to the question are presented in Table 1 and Table 2.

Table 1: Students' Digital Game Playing Status

Gender	Yes	No	Frequency (f)
Girl	21	2	23
Boy	23	4	27
Total	44	6	50

Table 1 shows the data on the digital game playing status of 7th grade secondary school students. As seen in the table, it was determined that the majority of the students in the study group played digital games (f-44). The number of those who do not play games (f-6) was determined to be at a very low level. The number of boy and girl respondents playing games are close to each other can also be expressed as a remarkable result. The reasons why the respondents play digital games are given in Table 2. From the category who stated 'Yes', three codes were

identified related to enjoyment, boredom and learning while those stated 'No', indicated three codes related to waste of time, leading to addiction and harmful to health.

Table 2: Reasons for Playing Digital Games

Category	Code	Frequency (f)
Yes	Enjoyment	26
	Boredom	23
	Learning	7
No	Waste of time	3
	Leading to addiction	2
	Harmful to health	2
Total		63

Table 2 presents data on the reasons why the study group played games. Accordingly, it is seen that the number of statements given is numerically higher (f-63). The reason for this can be expressed by the fact that the participants in the study group provided more than one justification for the reasons for playing digital games. For example, Participant-19 provided more than one justification saying "Yes. For example, I mostly play car games. The reason: because I want to have fun and learn a little bit." Looking at the answers given to the question asked for the first sub-objective in Table 2, it was determined that almost all the students (f-56) played these games mostly for reasons such as having fun (f-26) and boredom (f-23). It was determined that those who do not play these games do not play these games for reasons such as wasting time, addiction and being harmful to health. Sample responses to the question are as follows:

"Yes. Because sometimes people get bored and want to play." (K-3)

"Yes, sometimes I play because it is fun for me. But when I play too much, I cannot play anymore, it gets boring." (K-8)

"No. Because I think it is a waste of time. Reading books instead of playing games is both educational and fun." (K-33)

3.2. Features Considered in Game Selection

The second sub-objective of the study is to determine the features considered when choosing digital games. The question asked in line with this sub-objective is "Which feature of the game do you pay attention to when choosing the digital games you play and why?". The code table and frequency values regarding the features considered in game selection are given in Table 3.

Table 3: Features Considered in Game Selection

Category	Code	Frequency (f)
Features of the Games	Content	49
	Recognition	7
	Security	6
	Cycle status	4
	Being instructive	2
	Covered area	2
	Those who do not pay attention	5
Other	Non-players	4
Total		79

As seen in Table 3, that the majority of the participants pay attention to the features of the games (f-70) when choosing a game. With the most important features considered being content, recognition and security. It is understood from the variety of codes that the features considered in game selection may vary from person to person. It is also noteworthy that there are participants who do not pay attention to game selection and do not play digital games. Sample expressions regarding the features considered in game selection are as follows:

"That it is fun. Because there is no need to play games if we are not going to have fun." (K-5)

"How much space it takes up. Because it makes the phone slower." (K-24)

"I make sure that it is fun and does not contain bad content." (K-47)

3.3. Classification of Games

There is no generally accepted classification of digital games (Kaleci, 2024). Therefore, digital games are classified in different ways according to the purpose of use, the materials used, the developmental period or the actions performed (Öztabak, 2017). In this sense, Hughes (2002) made a classification by dividing games into 16 different categories. However, in this study, the findings on the classification of digital games were classified according to the types of games played with the support of literature.

The third sub-objective of the study is to determine which digital games are played. In line with this sub-objective, the question directed to the participants was "What are the digital games or games you play? Please write their names." The codes and categories and frequency values of the responses to this question are presented in Table 4.

Table 4: Classification of Games

Category	Code/Played Games	(f)
Action Games	Pubg Mobile (f-9), Garena/Free Fire (f-4), Call of Duty (f-3), Valorant (f-3), Counter Strike (f-2), Dying Light (f-2), Age of Empires (f-1), Assassin's Creed (f-1), Brawhalla (f-1), Conquer the World (f-1), Fall Guys (f-1), Global Offensive (f-1), God of War (f-1), Left 4 Dead (f-1), Ninja Game (f-1), Outlast (f-1), Shadow Fight (f-1), Steel and Flesh (f-1), Zula (f-1), Z-World (f-1).	37
Creativity Games	Roblox (f-8), Minecraft (f-7), Toca Life World (f-3), Anime (f-1), Car Modified (f-1), Block Star Planet (f-1), Drawing Game (f-1), Dealer's Life (f-1), Forager (f-1), House Flipper (f-1).	25
Adventure Games	GTA Series (f-6), Subway Surf (f-3), Color Block (f-2), Naruto Shippuden (f-2), Dancing Line (f-1), Going Balls (f-1), Moonlighters (f-1), Piano Music Go (f-1).	17
Intelligence-Strategy Games	Brawl Stars (f-7), League of Legends (f-3), Clash Royal (f-2), Ludo (f-1), Mound & Blade (f-1), The Hacker Game (f-1), Sudoku (f-1).	16
Sports Games	FIFA Series (f-5), PES Series (f-3), DSL (f-1), Volleyball Arena (f-1).	10
Games Played with Device	Euro Track Simulator (f-3), Forza Horizon (f-3), Traffic Rider (f-2).	8
Other	Candy Crush Saga (f-2), Duolingo (English/f-1), Instagram (f-1), Luvlingua (English/f-1), Nonogram (Japanese puzzle/f-1), Tiktok (f-1).	7
Total		120

The findings related to the third sub-objective of the study are presented in Table 4. Classification was carried out by determining which game was included in which kind of classification. It can be stated that the games played

are classified in different ways and show diversity. The game played most are action games (f-37) that require the struggle for survival. In addition, it is seen that creativity, adventure and intelligence-strategy games were also played at higher frequencies. The least played games were the games played with devices and the ones given under the title, other games. The fact that the participants in the study group played more than one game can be expressed as a remarkable result. Sample expressions regarding the classification of games are as follows:

"Color Block/Traffic Rider/Drawing Games/GTA/ Ninja/Naruto/Dancing Line/ Music Piano" (K- 1)

"Brawl Stars, Roblox, Toca World, Minecraft." (K-13)

"League of legends (LOL)" (K-22)

3.4. Emotions Emphasized While Playing Games

The fourth sub-objective of the study is to determine the emotions that come to the fore while playing digital games. The question asked in line with this sub-objective is "What are the emotions that come to the fore for you while playing digital games?". The code and category table and frequency values of the responses are presented in Table 5.

Table 5: Emotions that come to the fore while playing games

Category	Code	Frequency (f)
Positive emotions	Happiness	20
	Excitement	18
	Enjoyment	14
	Self-confidence	5
Negative emotions	Stress	10
	Greed	6
	Anger	4
	Fear	3
Other	Not aware	4
Total		84

Table 5 presents the findings regarding the emotions that come to the fore while playing games. Accordingly, it is noteworthy that the emotions are generally positive, but there are also negative emotions. Happiness, excitement and having fun were the most common positive emotions, while stress was the most negative emotion followed by ambition. It can be stated that this situation is related to the fact that students see the game as an activity related to their happiness. Sample expressions related to emotions are as follows:

"A sense of fun, curiosity." (K-34)

"I am happy when I play games." (K-44)

"I have fun, laugh and enjoy playing with love." (K-47)

3.5. Recommendation Status of the Games

The fifth sub-objective of the study is associated with determining the recommendation of playing digital games. The question asked in line with this sub-objective is "Do you recommend playing digital games to your friends and why?". The code and category table and frequency values of the responses are presented in Table 6.

Table 6: Recommendation Status of the Games

Category	Code	Frequency (f)
Yes	Being fun	15
	Stress relief	7
	Developing intelligence	5
No	Addiction	9
	Time Loss	8
	Harm to health	5
	Reducing success	2
Other	Not playing	4
	Not recommended	3
Total		58

It is better to quantify to indicate the total for each category like 'Twenty-seven responded with 'Yes' while twenty-four responded with 'No'. There were 7 respondents in the 'Other Category'. It is seen that those who play digital games recommend these games mostly on the grounds of "being fun". It was determined that those who responded with "No" do not recommend these games for reasons such as addiction and waste of time.

When positive and negative codes are considered together, it can be stated that the recommendation of students who play digital games stems from the perceptions and environments of individuals. Therefore, the recommendation situation is determined in line with the internal and external factors affecting the individual and this situation varies from person to person. Sample responses regarding recommending or not recommending are as follows:

"I recommend it if it is a game we will have fun together." (K-6)

"I recommend digital games to my friend. For example, if my friend lives far away, we can chat with him/her by playing games." (K-20)

"I would not recommend it because it can be addictive and decrease success in lessons." (K-23)

4. Discussion and Conclusion

The number of studies on digital games is increasing day by day. It was observed that 88% of the students two different schools in Malatya city center actively play digital games, even at different levels. In this sense, when evaluated in terms of children in the 11-14 age group, it is thought that playing these games may lead to some negative consequences in this age group.

In the study, the number of boy students who stated that they do not play games is higher than the number of girl students. In addition, the fact that the number of boy and girl students who play games is close to each other can be stated as a significant result. This is contrast to observations by boy students play digital games more than girl students (Griffiths et al., 2012; Öztabak, 2017; Karabulut, 2019; Keskin 2019; Soyöz-Semerci & Balci, 2020).

Digital games have negative mental, physical, psychological, spiritual, emotional, social, economic and moral effects. The negative effects of games include violence, aggression, loneliness, fatigue, sleep disturbance, depression, anxiety, obsessive-compulsive disorder, internet addiction, game addiction, peer bullying and lack of socialization. Physical effects include obesity, back pain, neck pain, physical inactivity, orthopedic action muscle disorders, and vision and hearing problems (Green & McNeese, 2008; Güvendi et al., 2019; Hazar et al., 2020; Özdemir & Karaboğa, 2021; Çakır, 2022; Widiyawati & Arby, 2022). In another study, Yunusoğlu (2025) states that although there are harmful, there are also beneficial aspects. In which digital games contribute positively to students' creative thinking, visual design and artistic development processes, he also found that they cause physical

impairment. Thus, it can be concluded that digital games have harmful aspects that negatively affect human health as well as beneficial aspects.

Despite the negative effects, Granic et al. (2014) and Aleksić (2018) determined that with the increase in the level of game addiction; problem-solving skills in children can be developed, helping them in transferring items from digital environments to the real world, developing the desire to cooperate to solve problems, and has cognitive, motivational, emotional and social benefits.

The results obtained within the scope of the research questions are given below respectively.

Within the scope of the first question of the research, pertaining to the status of playing digital games is striking. Accordingly, it was determined that these games are played for fun, to relieve boredom and to learn. In addition, it was determined that digital games were avoided for reasons such as wasting time, being addictive and harming health. Işıkoğlu Erdoğan (2019) and Özdemir & Karaboğa (2021) state in their study that parents apply to the devices such as television and computers to distract their children who are bored at home, which leads to addiction. They suggest spending time with the family as a way of protecting children from addictions. Keskin (2019) concluded in his study that students who have more than one game tool are more addicted to games.

Within the scope of the second research question, it was observed that content was particularly important in game selection. However, there are also children who do not pay attention to the content and do not play games. In their study, Dursun and Eraslan-Çapan (2018) determined that adolescents make preferences for the need for entertainment in game selection. Toran et al. (2016) found that digital games are played more especially by children because they are fun, while Surbakti et al. (2022) found that it is one of the popular entertainment among young people. Accordingly, the fact that the content is entertaining is important in preference to playing the game.

Within the scope of the third research question, which the digital games were played were determined. The games played were presented in seven categories by the researchers. Action, creativity, adventure and intelligence-strategy games were the games played most. It was determined that Pubg Mobile in the action category, Roblox in the creativity category, GTA in the adventure games category, and Brawl Stars in the intelligence-strategy games category were the games played most. Aktaş & Bostancı (2021) compared the digital game playing time of university students before and during the pandemic. During the pandemic period, digital games were mostly played with phones during the pandemic, and the rate of playing war-strategy games had increased significantly. Similarly, according to the Digital Games Information Platform (2023); Pubg Mobile, Brawl Stars, Garena Free Fire, Head Ball 2, Roblox, 101 Okey Plus, Mobile Legends Bang Bang, Lords Mobile and similar games were preferred via mobile phones in Turkey in 2020, while hyper-casual and puzzle games were preferred by the general player base. Individuals were keener on digital games during the pandemic period and the game industry expanded even more.

Within the scope of the fourth research question, it was determined that positive emotions such as happiness, excitement and fun and negative emotions such as stress and greed came to the fore in children while playing digital games. Accordingly, it is understood that positive emotions are felt more than negative emotions while playing digital games. Games are entertainment tools that are preferred more especially by young people and children. It is understood that children feel different emotions during the game. In his study on internet games, Öztürk (2017) found that out of 80 students who participated in the study, the rate of students who would not feel any negative emotions when they removed internet games from their lives was 15%, and the rate of students who did not want internet games to leave their lives and who stated that they would have negative emotions when these games left their lives was 85%. This situation shows that school-age children are addicted to games. Güvendi et al. (2019) and Özdemir and Karaboğa (2021) found that more than half of secondary students were at risk of digital game addiction. When an inference is made regarding the level of addiction, it can be stated that the digital game addiction levels of the students are quite high and similar to the results of the study.

The fifth research question is related to the recommendation of digital games. More than half of the secondary school students participating in the study had negative perceptions. It is seen that almost half of the students recommend playing digital games to their friends. It can also be stated that being fun has an important effect on

recommendation. Biricik & Atik (2021) reported that children play similar games. It can be concluded that popularity and peer interaction are decisive in this. Similar observation was reported by Biricik & Atik (2021) has similar results with the results of this study.

As a result, it was determined that the perceptions of digital games of 7th grade secondary school students were significant in favor of game playing and their game playing levels were quite high. In this sense, it seems very difficult to prevent young generations who find themselves in the digital world from playing these games. For this reason, it is necessary to plan in the content of the games, attempt to reduce the duration of use and measures to reduce game addiction. It is understood that negative emotions come to the fore as well as positive emotions while playing digital games. Therefore, it is understood that young people should be more careful in the selection and play of digital games, and educational stakeholders and parents should have an awareness and consciousness about the issue. Based on the outcome of the study and the from literature reviews, the following suggestions can be made.

- ✓ As the study is a qualitative research with small sample size, more comprehensive studies should be conducted by using quantitative and mixed-method.
- ✓ Studies can be conducted with different research methods with different age groups beyond the 7th grade students starting from preschool period to postgraduate levels. In addition, comparative studies can be conducted between different levels.
- ✓ With digital game addiction determined at very high levels, awareness on the subject can be raised by organizing interviews, conferences and seminars for students, parents, teachers and parents. Support can be received from institutions and organizations that fight against digital game addiction.
- ✓ Considering that digital games are being played more and more every day, it is necessary to regulate the content of existing games and to filter the new games with content that may negatively affect the individual.
- ✓ By popularizing traditional games, especially intelligence games such as chess, etc., and sports activities among young generations, it can be ensured that they get rid of digital games and the addictions caused by these games.

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The Role of Change Leadership, Academic Supervision, and Self-Efficacy Mediated by Motivation to Improve Teacher Pedagogical Performance

Fahmie Firmansyah¹, Sudadio², Dase Erwin Juansah³

^{1,2,3} Doctoral Program in Education, Sultan Ageng Tirtayasa University, Serang, Indoensia

Correspondence: Doctoral Program in Education, Sultan Ageng Tirtayasa University, Serang, Indoensia. Tel: +6282297539470. E-mail: 7782220019@untirta.ac.id

Abstract

The average score of 59.03 in the 2022 Teacher Competency Test indicates the low pedagogical competence of teachers in Cilegon City. Low pedagogical competence has an impact on the declining quality of learning, curriculum achievement, and student learning outcomes. This study aims to analyse the effect of changed leadership, academic supervision, and self-efficacy on teacher pedagogical performance, with work motivation as a mediating variable. This study uses a quantitative approach with an ex post facto survey method and a path analysis model to test direct and indirect relationships between variables. The results of the study indicate that change leadership, academic supervision, and self-efficacy have a significant effect on teacher work motivation. Furthermore, the study demonstrates that work motivation significantly acts as a mediator in shaping teacher pedagogical competence. Adaptive change leadership, substantive implementation of academic supervision, and strong self-efficacy, when combined with high work motivation, can improve teacher pedagogical performance more optimally. The novelty of this study lies in the mapping of the role of motivation as a mediating variable that bridges the influence of leadership, supervision, and self-efficacy on teacher pedagogical performance holistically. This finding provides an important contribution to the development of a more contextual and sustainable educational intervention model, especially in improving teacher quality and education quality in Indonesia.

Keywords: Academic Supervision, Change Leadership, Motivation, Self-Efficacy, Teacher Pedagogical Performance

1. Introduction

The role of educators in attaining excellent educational accomplishment is crucial for the enhancement and development of human resources. Competent human resources capable of excelling in various domains significantly influence the attainment of national educational objectives and the advancement of the Unitary State of the Republic of Indonesia (Indrawati & Kuncoro, 2021), the presence of skilled and proficient individuals in

the education sector can facilitate student learning outcomes and enhance the overall quality of education (Chester et al., 2002). Numerous variables might signify an enhancement in educational quality, encompassing school facilities and infrastructure, educational expenses, teaching staff, educational personnel, parental involvement, student engagement aspects, and school administration in the orchestration of education (Aithal & Maiya, 2023; Firdaus et al., 2025; Shukla, 2023). Teachers with high performance quality will continually enhance educational standards; conversely, those whose performance falls below the minimal threshold will impede the advancement and growth of educational quality (Seery et al., 2022). Teachers will excel if the principal offers direction and oversight of their work. Educators are a critical component in the education system that enhances student accomplishment (Saronto, 2025). Consequently, any initiatives aimed at enhancing educational quality would be ineffectual without the backing of skilled and experienced educators. Enhancement of teacher effectiveness is essential to attain the established educational objectives via diverse efforts and tactics.

According to the results of the 2022 Teacher Competency Test, the average pedagogical competence in Cilegon City was 59.03 (npd.kemdikbud.go.id). The pedagogical competency test results for Cilegon City, which stands at 59.03, indicates that the pedagogical competence of instructors in the area is deficient. Pedagogical competence refers to a teacher's capacity to engage with students, organize and execute educational experiences, assess learning outcomes, and facilitate the realization of students' diverse potentials. The inadequate pedagogical competence indicates that many educators must enhance their skills and proficiency in delivering quality education to pupils (Bremner et al., 2023). The influence of inadequate teacher pedagogical ability is evident in the learning process, when the quality of instruction and instructors' comprehension of the content are suboptimal (Toom, 2024). This may also affect pupils' comprehension and proficiency in mastering the subject matter effectively. Furthermore, inadequate teacher pedagogical competence will adversely affect the quality of instruction provided by educators, which will consequently diminish the overall quality of school education and, by extension, the national education system (Torrance et al., 2022).

Low teacher pedagogical performance can reduce the quality of learning in the classroom, because teacher pedagogical competence plays an important role in creating an effective and meaningful learning process for students (König et al., 2021). Limitations in pedagogical knowledge and classroom management cause the quality of learning to decline, so students do not get an optimal learning experience (Yang & Kaiser, 2022). This impacts low student motivation, participation, and involvement in the learning process, ultimately reducing the overall quality of education (Bremner et al., 2022).

In addition, low teacher pedagogical performance also directly impacts the achievement of curriculum objectives, because teachers who do not have adequate pedagogical competence tend to have difficulty implementing the curriculum effectively (Rokimin & Manaf, 2024). Suboptimal teacher quality and pedagogical competence cause the learning objectives designed in the curriculum not to be achieved optimally (Sudargini & Purwanto, 2020). As a result, the learning process becomes less focused and unable to meet the expected educational standards (Roca-Campos et al., 2021).

Another impact of low pedagogical performance is a decline in student learning outcomes in terms of academic achievement and non-cognitive development (Sağlam et al., 2023). Research shows that teacher pedagogical competence significantly influences student learning outcomes, where increasing this competence can improve academic achievement and student development as a whole (Cobanoglu et al., 2023). Therefore, efforts to improve teacher pedagogical performance are significant to ensure optimal learning quality, curriculum objectives, and student learning outcomes (Bednar & Brown, 2024).

The problem of low teacher pedagogical competence in Indonesia is increasingly prominent, along with changes in education policies that require teachers to continue to adapt to new demands in the learning process (Hertz et al., 2022). Teachers are expected to be able to master various pedagogical competencies, such as understanding student characteristics, applying learning theories, and managing classes effectively. However, in reality, many teachers still face obstacles in their implementation due to limited ongoing training and adequate supporting facilities (Zulkarnain et al., 2025). In addition, low student learning outcomes and teacher competencies indicate

that mastery of pedagogical competencies is not optimal, so special strategies are needed to improve the quality of education by strengthening teacher competencies (Amaliah et al., 2024).

On the other hand, not all schools have leadership that is adaptive to change, even though responsive leadership is critical to support teachers in facing the dynamics of education policy (Mallillin, 2022). Adaptive leadership can encourage innovation, strengthen accountability, and provide solutions to the challenges faced by teachers in the learning process (Grice et al., 2023). The lack of adaptive leadership makes it difficult for teachers to adapt to change, resulting in low motivation and performance in developing pedagogical competence (Singerin, 2024a). Therefore, strengthening adaptive leadership in the school environment is one of the keys to improving teacher pedagogical competence and the overall quality of education.

The problem of low teacher pedagogical competence in schools is often rooted in the implementation of academic supervision, which tends to be administrative and does not touch on the substantive aspects of improving teaching quality (Yani et al., 2022). Many teachers do not yet understand the function and implementation of academic supervision, so efforts to improve pedagogical competence do not run optimally. In addition, the effectiveness of academic supervision carried out by the principal is generally still in the moderate category. Hence, its contribution to developing teachers' pedagogical competence is also limited (Saleh & Mutiani, 2021). This is exacerbated by the lack of supervisors who can provide intensive assistance in implementing academic supervision in schools.

Academic supervision that only focuses on administrative aspects, such as the completeness of learning documents, often ignores the need for teachers to get constructive feedback regarding teaching practices in the classroom (Singerin, 2024b). As a result, improving teachers' pedagogical competence is slow and uneven, because supervision has not been directed at effectively strengthening skills in managing learning (Ahmadi & Hadi, 2023). Research shows that optimizing substantive academic supervision can significantly improve teachers' pedagogical competence (Suryani, 2023). Therefore, a paradigm shift is needed in implementing academic supervision to emphasize more on fostering professionalism and classroom learning quality.

Teachers with high self-efficacy tend to be more confident in developing learning strategies, facing challenges in the classroom, and building positive relationships with students, which ultimately impacts the quality of the learning process and the psychological well-being of teachers (Hajovsky et al., 2020). Teacher self-efficacy also plays an important role in increasing enthusiasm, job satisfaction, and commitment to the profession and reducing the risk of work exhaustion or burnout (Haghayeghi & Moghadamzadeh, 2025; Huang et al., 2019). In addition, teachers with strong self-efficacy can better manage classroom behavior and adjust teaching practices according to student needs, including in the context of inclusive education (Wray et al., 2022).

However, in changing learning systems, many teachers experience confusion or uncertainty regarding their roles and responsibilities, which can affect the development of their professional identity and self-efficacy (Marschall, 2022). This uncertainty often arises due to external pressures, such as administrative demands, curriculum changes, or the shift to online learning, which require teachers to continuously adapt and develop new skills (Martin & Mulvihill, 2019). In this context, doubt or self-doubt can trigger teachers to evaluate themselves and seek more effective learning strategies, so the learning process continues optimally even amid change.

Teacher work motivation is an important internal factor in encouraging teachers to actualize their professional potential optimally. This motivation does not only come from intrinsic factors such as personal goals, sense of achievement, and individual characteristics, but is also influenced by extrinsic factors such as national education policies, support from colleagues, and a conducive school environment (Rothinam, 2023). Teachers with high work motivation tend to show greater commitment to their profession, create a supportive classroom atmosphere, and have better psychological resilience in facing work challenges.

Without strong work motivation, supervision, or training efforts given to teachers, they are often unable to produce significant behavioral changes, so teachers tend to work routinely and are less reflective of the learning practices carried out (Wulandari et al., 2022). Research shows that high work motivation is directly related to increased teacher performance, productivity, and job satisfaction, while low motivation can cause teachers to be less

innovative and less enthusiastic in developing themselves and their students (Layek & Koodamara, 2024). Therefore, it is important for educational institutions to create a supportive environment and effective human resource management strategies to increase teacher work motivation sustainably.

Most studies on teacher performance focus on the direct influence of leadership, supervision, or self-efficacy on teacher performance in schools (Luo et al., 2024; E. Puspitasari, 2024). These studies show that principal leadership, academic supervision, and teacher self-efficacy levels have a positive and significant relationship with improving teacher performance, both individually and collectively. In addition, factors such as professional development, job satisfaction, and compensation have also been shown to play a role in supporting teacher performance through the influence of leadership and self-efficacy (Mammadzada, 2021).

However, there is still little research that deeply explores the role of motivation as a mediator that bridges the relationship between leadership, supervision, or self-efficacy with teacher pedagogical performance as a whole (Huda et al., 2025). Several recent findings highlight that work motivation can be a key factor that strengthens the impact of leadership and organizational culture on teacher performance, but the mediating mechanism of this motivation has not been studied comprehensively (Nadrah, 2023). Therefore, further research is needed to examine the role of change leadership, academic supervision, and self-efficacy in teacher pedagogical performance mediated by motivation as a link between various key factors so that it can provide a more complete understanding of efforts to improve the quality of education.

Discuss the relevant related literature, but do not feel compelled to include an exhaustive historical account. Assume that the reader is knowledgeable about the basic problem and does not require a complete accounting of its history. A scholarly description of earlier work in the introduction provides a summary of the most recent directly related work and recognizes the priority of the work of others. Citation of and specific credit to relevant earlier works are signs of scientific and scholarly responsibility and are essential for the growth of a cumulative science. In the description of relevant scholarship, also inform readers whether other aspects of this study have been reported on previously and how the current use of the evidence differs from earlier uses. At the same time, cite and reference only works pertinent to the specific issue and not those that are of only tangential or general significance. When summarizing earlier works, avoid nonessential details; instead, emphasize pertinent findings, relevant methodological issues, and major conclusions. Refer the reader to general surveys or research syntheses of the topic if they are available. Demonstrate the logical continuity between previous and present work. Develop the problem with enough breadth and clarity to make it generally understood by as wide a professional audience as possible (Beck & Sales 2001). Do not let the goal of brevity lead you to write a statement intelligible only to the specialist.

2. Hypotheses Development and Research Design

The primary research question asks: direct effect of change leadership on motivation (H1), direct effect of academic supervision on motivation (H2), direct effect of self-efficacy on motivation (H3), direct effect of change leadership on teacher pedagogical performance (H4), direct effect of academic supervision on teacher pedagogical performance (H5), direct effect of self-efficacy on teacher pedagogical performance (H6), direct effect of motivation on teacher pedagogical performance (H7), indirect effect of change leadership on teacher pedagogical performance through motivation (H8), indirect effect of academic supervision on teacher pedagogical performance through motivation (H9), indirect effect of self-efficacy on teacher pedagogical performance through motivation (H10), and indirect effect of change leadership, academic supervision, and self-efficacy simultaneously on teacher pedagogical performance through motivation (H11).

Improving teacher performance is a central issue in efforts to improve the quality of education, where teachers are not only required to master the technical aspects of learning, but also need to be supported by work motivation, effective leadership, and strong self-confidence (Mutiarra & Ayu, 2024). Various studies have shown that technical training alone cannot change teacher performance significantly. Hence, interventions that integrate motivational reinforcement, change leadership, and self-efficacy are critical to create a productive and innovative work environment (Wahyuti & Boussanlègue, 2025). In addition, school leadership that empowers and provides space

for teachers to develop professionally has increased teacher motivation, commitment, and teaching quality (Irwanto & Maria, 2025).

In Indonesia, the need for a more contextual model for improving teacher performance is increasingly time-sensitive, considering that the educational challenges faced at the local level require adaptive and relevant solutions (Pujilestari et al., 2023). Previous research confirms that strategies that combine training, motivational reinforcement, change leadership, and self-efficacy development can make a real contribution to improving teacher performance and student learning outcomes (Miranti et al., 2024). Thus, the results of this study are expected to be the basis for designing educational interventions that are more effective, sustainable, and in accordance with the specific needs of teachers in Cilegon City and in Indonesia in general (Khofi, 2024).

3. Research Methods

This study employs a quantitative approach and utilises an ex post facto survey as its research method. The main problem in this study is to see the effect of change leadership, academic supervision, and self-efficacy on teacher pedagogical competence through motivation, so this research model is path analysis consisting of exogenous and endogenous variables. Exogenous variables are variables that affect other variables, either directly or indirectly. In this study, exogenous variables consist of change leadership (CL), academic supervision (AS), and self-efficacy (SE). Other variables exert an influence on endogenous variables. In this study, the endogenous variables are teacher motivation (Mo) and teacher pedagogical competence (TPP). The theoretical framework of this research is in Figure 1.

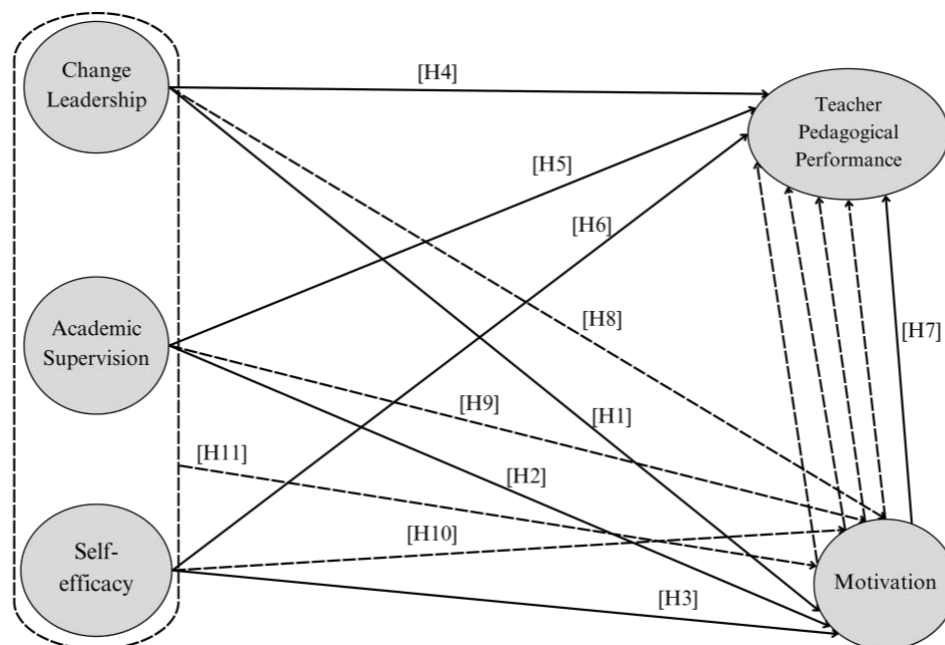


Figure 1: Research theoretical framework

The target population of this study was all teachers of State Junior High Schools throughout Cilegon City, with the status of civil servants and a population of 507 teachers. The sample data were 230 teachers, 87 men (38%) and 143 women (62%). The target population for this study comprises all junior high school teachers in Cilegon City as outlined below (table 1):

Table 1: Population and research sample

School name	Subdistrict	Number of Population	Number of Sampel
State Junior High School 1 Cilegon	Jombang	42	33
State Junior High School 2 Cilegon	Cilegon	32	25
State Junior High School 3 Cilegon	Grogol	54	42
State Junior High School 4 Cilegon	Ciwandan	51	40
State Junior High School 5 Cilegon	Cibeber	56	44
State Junior High School 6 Cilegon	Pulomerak	36	28
State Junior High School 7 Cilegon	Cilegon	29	23
State Junior High School 8 Cilegon	Cibeber	33	26
State Junior High School 9 Cilegon	Ciwandan	28	22
State Junior High School 10 Cilegon	Pulomerak	24	19
State Junior High School 11 Cilegon	Citangkil	32	25
State Junior High School 12 Cilegon	Purwakarta	24	19
State Junior High School 13 Cilegon	Jombang	27	21
State Junior High School 14 Cilegon	Citangkil	25	20
State Junior High School 15 Cilegon	Grogol	14	11
Total		507	230

The validation and reliability procedures guarantee that the questionnaire yields precise and consistent measurements among various responders. The analytical procedure adheres to a systematic sequence to guarantee statistical integrity. This research instrument uses a Likert scale of 1-5 (table 2). The instrument or questionnaire is compiled by containing statements that have been equipped with alternative answer choices.

Table 2: Likert Scale Statement

Likert Scale Statement		Likert scale
Positif	Negatif	
Strongly agree	Strongly disagree	5
Agree	Disagree	4
Neutral	Neutral	3
Disagree	Agree	2
Strongly disagree	Strongly agree	1

Data analysis techniques in the study used SPSS version 25; the test in this study used the classical assumption test using the Kolmogorov-Smirnov estimation error normality test, linearity test, regression test, multicollinearity test, and Glejser heteroscedasticity test. The hypothesis test employed the correlation test, utilising the Pearson product moment and the Sobel test.

4. Results

The normality test is a statistical method to determine whether the collected data follows a normal distribution. A normal distribution, often described as a "mountain" or "bell" shape, has most of the data centred around the middle value and little data at either end (Mohd Ibrahim, 2024). This test is important in quantitative analysis because many statistical techniques, such as regression analysis and t-tests, assume that the data are normally distributed. Based on the results of the normality test, it can be concluded that all data in this study are normally distributed (table 3).

Table 3: Recapitulation of the results of the Kolmogorov-Smirnov estimation error normality test

Variable	Probability of significance	$\alpha = 0.05$	Criteria	Conclusion
CL $\rightarrow$ Mo	0.20	0.05	$0.20 > 0.05$	Normally Distributed
SE $\rightarrow$ Mo	0.29	0.05	$0.29 > 0.05$	Normally Distributed
AS $\rightarrow$ Mo	0.23	0.05	$0.23 > 0.05$	Normally Distributed
CL $\rightarrow$ TPP	0.18	0.05	$0.18 > 0.05$	Normally Distributed
SE $\rightarrow$ TPP	0.90	0.05	$0.90 > 0.05$	Normally Distributed
AS $\rightarrow$ TPP	0.27	0.05	$0.27 > 0.05$	Normally Distributed
Mo $\rightarrow$ TPP	0.32	0.05	$0.32 > 0.05$	Normally Distributed

A linearity test is a statistical procedure used to determine whether there is a linear relationship between two or more variables. The linearity test aims to determine whether there is a linear relationship between the dependent variable and the independent variable in a regression model (Hall & Oakes, 2023). Based on the results of the linearity test and the significance test of the regression equation above, it can be concluded that the data in this study are all linear and have a significant regression equation (table 4 and table 5).

Table 4: Recapitulation of linearity test results

Variable	Linearity	Deviation from linearity	$\alpha = 0.05$	Conclusion
CL $\rightarrow$ Mo	$0.003 < 0.05$	$0.10 > 0.05$	0.05	Linear
SE $\rightarrow$ Mo	$0.003 < 0.05$	$0.12 > 0.05$	0.05	Linear
AS $\rightarrow$ Mo	$0.001 < 0.05$	$0.17 > 0.05$	0.05	Linear
CL $\rightarrow$ TPP	$0.002 < 0.05$	$0.12 > 0.05$	0.05	Linear
SE $\rightarrow$ TPP	$0.002 < 0.05$	$0.13 > 0.05$	0.05	Linear
AS $\rightarrow$ TPP	$0.001 < 0.05$	$0.14 > 0.05$	0.05	Linear
Mo $\rightarrow$ TPP	$0.000 < 0.05$	$0.16 > 0.05$	0.05	Linear

Table 5: Recapitulation of regression test results

Variable	t value	t table	sig.	$\alpha = 0.05$	Conclusion
CL $\rightarrow$ Mo	2.518	1.971	0.003	0.05	Significant
SE $\rightarrow$ Mo	3.001	1.971	0.002	0.05	Significant
AS $\rightarrow$ Mo	2.351	1.971	0.001	0.05	Significant
CL $\rightarrow$ TPP	6.724	1.971	0.001	0.05	Significant
SE $\rightarrow$ TPP	7.925	1.971	0.000	0.05	Significant
AS $\rightarrow$ TPP	7.243	1.971	0.000	0.05	Significant
Mo $\rightarrow$ TPP	9.537	1.971	0.002	0.05	Significant

The multicollinearity test is one of the statistical techniques used to identify the presence of a high correlation between two or more independent variables in a regression model (Clark-Carter, 2024). This test is important because multicollinearity can cause problems in the estimation and interpretation of regression coefficients, thus affecting the accuracy of the model. Based on the results of the multicollinearity test analysis, it was obtained that all data had a tolerance value greater than 0.100 and a VIF value of less than 10.00 (table 6). Table 6 indicates the absence of multicollinearity symptoms.

Table 6: Recapitulation of multicollinearity test results

Variable	Criteria		Conclusion
	Tolerance	VIF	
CL $\rightarrow$ Mo	$0.158 > 0.100$	$9.173 < 10.00$	There are no symptoms of multicollinearity
SE $\rightarrow$ Mo	$0.134 > 0.100$	$8.429 < 10.00$	There are no symptoms of multicollinearity
AS $\rightarrow$ Mo	$0.179 > 0.100$	$8.562 < 10.00$	There are no symptoms of multicollinearity
CL $\rightarrow$ TPP	$0.122 > 0.100$	$7.473 < 10.00$	There are no symptoms of multicollinearity
SE $\rightarrow$ TPP	$0.164 > 0.100$	$9.715 < 10.00$	There are no symptoms of multicollinearity

Variable	Criteria		Conclusion
	Tolerance	VIF	
AS → TPP	0.182 > 0.100	7.531 < 10.00	There are no symptoms of multicollinearity
Mo → TPP	0.119 > 0.100	9.935 < 10.00	There are no symptoms of multicollinearity

The heteroscedasticity test is a statistical procedure used to determine whether a regression model exhibits inequality in residual variance (Clark-Carter, 2024). In regression analysis, a crucial assumption is that the error variance (residual) remains constant across the range of independent variable values, a condition referred to as homoscedasticity. The results of the heteroscedasticity test indicated that all data had a significant probability value of less than 0.05 (see table 7). Therefore, it can be concluded from table 7 that none of the data displayed symptoms of heteroscedasticity.

Table 7: Recapitulation of heteroscedasticity test results

Variable	Sig.	$\alpha = 0.05$	Criteria	Conclusion
CL → Mo	0.735	0.05	0.735 > 0.05	There are no symptoms of heteroscedasticity
SE → Mo	0.328	0.05	0.328 > 0.05	There are no symptoms of heteroscedasticity
AS → Mo	0.410	0.05	0.410 > 0.05	There are no symptoms of heteroscedasticity
CL → TPP	0.614	0.05	0.614 > 0.05	There are no symptoms of heteroscedasticity
SE → TPP	0.328	0.05	0.328 > 0.05	There are no symptoms of heteroscedasticity
AS → TPP	0.329	0.05	0.329 > 0.05	There are no symptoms of heteroscedasticity
Mo → TPP	0.538	0.05	0.538 > 0.05	There are no symptoms of heteroscedasticity

Hypothesis testing in path analysis examines the causal relationships between variables in a model. Path analysis is a statistical technique used to explore and verify complex causal relationship models in table 8, table 9, and table 10 involving exogenous variables (change leadership, principal academic supervision, and self-efficacy) and endogenous variables (motivation and teacher pedagogical performance).

Table 8: Recapitulation of direct influence test results

Variable	Path coefficient	t value	t table	p-value	Conclusion
CL → Mo	0.483	2.618	1.971	0.001	Positive and significant
SE → Mo	0.371	3.936	1.971	0.000	Positive and significant
AS → Mo	0.352	4.537	1.971	0.001	Positive and significant
CL → TPP	0.437	3.835	1.971	0.002	Positive and significant
SE → TPP	0.381	3.925	1.971	0.002	Positive and significant
AS → TPP	0.530	5.538	1.971	0.003	Positive and significant
Mo → TPP	0.427	4.835	1.971	0.002	Positive and significant

Table 9: Recapitulation of indirect influence test results

Variable	Path coefficient	t value	t table	p-value	Conclusion
CL → Mo → TPP	0.643	9.649	1.971	0.000	Positive and significant
SE → Mo → TPP	0.539	8.794	1.971	0.002	Positive and significant
AS → Mo → TPP	0.683	10.839	1.971	0.002	Positive and significant

Table 10: Recapitulation of the results of the indirect simultaneous effect test

Variable	f value	f table	p-value	Conclusion
CL, SE, AS → Mo → TPP	39.835	9.649	0.000	Positive and significant

5. Discussion

Principal change leadership has a direct and significant influence on teacher performance, where an effective leadership style can increase teacher productivity and work enthusiasm, especially teacher pedagogical performance (Edi & Sudadio, 2023). In addition, change leadership implemented by the principal has also been

shown to contribute significantly to teacher pedagogical performance in schools (Pambudi & Gunawan, 2020). The positive relationship between principal leadership and teacher performance emphasises the importance of leaders' role in creating a conducive work environment (Martini et al., 2024). Supportive and motivating leadership can encourage teachers to achieve more optimal educational goals (Mahdi et al., 2025).

Structured and consistent academic supervision has been shown to have a significant influence on increasing teacher pedagogical performance, both individually and collectively (Mustahyi et al., 2021). Optimal implementation of academic supervision can help teachers develop teaching skills and improve the quality of learning in the classroom (Edi & Sudadio, 2023). Academic supervision also acts as a tool to improve teachers' ability to plan, implement, and evaluate the learning process (Martini et al., 2024). With effective supervision, teachers feel more supported and motivated to improve their performance.

Self-efficacy, or teachers' self-confidence in their abilities, has a strong relationship with teacher pedagogical performance, where high levels of self-efficacy encourage teachers to be more innovative and effective in teaching (Puspitasari et al., 2024). The reciprocal relationship between teacher leadership and self-efficacy shows that increasing self-efficacy can strengthen educational practices and student learning outcomes (Mifsud, 2024). Self-efficacy is also an important predictor in determining the level of teacher performance in schools. Teachers who have high self-efficacy tend to be more confident in facing challenges and adapting to change (Akman, 2021).

Work motivation, both within the teacher and with the support of the principal, contributes significantly to improving teacher pedagogical performance. High achievement motivation in teachers can encourage them to continue to improve their competence and work results (Edi & Sudadio, 2023; Firmansyah et al., 2025). Motivational support from the principal has also been shown to have a stronger influence than academic supervision in improving teacher pedagogical performance (Armianti et al., 2025). With optimal motivation, teachers are more enthusiastic in carrying out their duties and responsibilities at school.

Change leadership has been shown to have a significant influence on teacher pedagogical performance, both directly and through work motivation as a mediator (Mifsud, 2024). Research shows that effective leadership can increase teacher work motivation, which ultimately has a positive impact on teacher pedagogical performance (Tajudin et al., 2021). In addition, the results of the study Sudarman et al., (2021) revealed that change-orientated leadership contributes greatly to improving teacher performance, with work motivation playing a determining factor in strengthening this relationship. Supportive and inspiring leadership can create a work environment that motivates teachers to work more optimally (Rasidinurahmad et al., 2022).

Teacher self-efficacy has a direct effect on teacher pedagogical performance, with work motivation as a mediator that strengthens the relationship (Anawati & Mahayasa, 2023). Teachers who have high self-efficacy tend to be more motivated in carrying out their duties, thus having an impact on improving performance (Westbrook & Peterson, 2022). Other studies have also found that self-leadership, which is closely related to self-efficacy, can increase teacher work motivation and indirectly improve their performance (Hattari & Ariyanto, 2023). Work motivation is an important bridge connecting self-efficacy with better teacher performance.

The principal's academic supervision has a significant effect on teacher pedagogical performance, both directly and through work motivation as an intermediary variable (Palupiningsih et al., 2021). Research shows that effective academic supervision can increase teacher work motivation, which ultimately has a positive impact on their performance (Saine et al., 2023). In addition, the combination of academic supervision and work motivation has been shown to have a greater impact on improving teacher performance than if only one factor is improved (Irhan et al., 2021). Structured and ongoing supervision can motivate teachers to continue to improve the quality of learning (Edi et al., 2024).

Change leadership, academic supervision, and self-efficacy have been proven to have a positive effect simultaneously on teacher pedagogical performance, where work motivation plays an important mediator in this relationship (Satria et al., 2024). Research shows that effective principal leadership can increase teacher work motivation, which ultimately has a significant impact on improving their performance (Martono & Prihatin,

2021). Structured academic supervision also contributes greatly to building teacher work motivation, thus encouraging collective performance improvement (Rusdiana et al., 2022). In addition, high teacher self-efficacy, supported by good organisational culture and leadership, strengthens work motivation and leads to more optimal performance (Supriyatna et al., 2023). These findings emphasise the importance of strategic interventions in the areas of leadership, supervision, and strengthening self-efficacy to maximise work motivation and teacher pedagogical performance.

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Addressing the Challenges and Complexities of Teaching English in Saudi Higher Education: Insights through a Sociocultural Lens

Thaar Alanazi¹

¹ Binghamton University

Abstract

This study examines the challenges and possibilities of incorporating sociocultural theory (SCT) into English as a Foreign Language (EFL) teaching in Saudi higher education, drawing on findings from multiple empirical and theoretical studies focused on the Saudi context. The review identifies key themes, including current pedagogical practices, cultural and religious factors, limited teacher preparation for sociocultural approaches, and the impact of institutional policies. It also explores learner expectations, identity formation, and the role of technology and assessment. The study highlights tensions between traditional methods and socioculturally informed practices and stresses the importance of contextual adaptation. Findings emphasize the need for professional development, culturally relevant strategies, and policy support to enhance student engagement, motivation, and effective communication. The study concludes by offering recommendations for practice and future research to bridge the gap between theory and application in Saudi EFL classrooms.

Keywords: Sociocultural Theory, EFL, Saudi Arabia, Pedagogical Practices, Cultural Context, Teacher Preparation, Learner Identity, Institutional Policy, Assessment, Technology Integration, Cross-Cultural Communication, Student Motivation, Higher Education

1. Introduction

English as a Foreign Language (EFL) education in Saudi Arabia has undergone significant expansion, particularly in higher education institutions, as English continues to serve as a key language for academic advancement, global communication, and professional development. Despite considerable investments in English education, many Saudi university students still face challenges in achieving communicative competence. Traditional, teacher-centered methods dominate classrooms, often overlooking the cultural, social, and cognitive dimensions of language learning emphasized in more contemporary approaches.

Sociocultural theory (SCT), grounded in the work of Vygotsky, provides a powerful lens for rethinking EFL pedagogy. It views language learning as a socially mediated process that occurs through interaction, collaboration, and participation within meaningful cultural contexts. SCT promotes learner agency, scaffolding, the Zone of Proximal Development (ZPD), and identity formation, all essential for creating responsive and inclusive EFL

classrooms. However, implementing SCT-informed practices in Saudi higher education is not without its challenges. The educational system is deeply influenced by cultural and religious norms, sociocultural approaches, and learners bring diverse expectations shaped by their sociocultural background. In addition, issues such as gender segregation, limited classroom interaction, and a heavy focus on grammar and memorization further complicate the integration of SCT.

Implementing sociocultural perspectives in English language teaching is important because it contributes to positive learning outcomes. Many studies stated that English is not the official language in Saudi Arabia. Iwai (2011) differentiated between English as a second language (ESL), and English as a foreign language (EFL) by stating that EFL refers to learning English in non-English speaking regions, while ESL refers to learning English in a country where it is used formally as a tool for communication. In addition, Alharbi (2022) indicated that English is a foreign language in Saudi Arabia, and all citizens do not need to communicate in English in their daily lives. Al-Tamimi (2019) stated that although Arabic remains the official language of Saudi Arabia, English is gaining traction as a lingua franca within the private sector, especially among Saudi citizens and the sizable foreign worker population. This reflects the increasing globalization of business and commerce, necessitating effective communication across diverse cultural backgrounds. For ESL learners, who are individuals learning English in a country where it is commonly spoken, the use of English as a lingua franca provides them with immersive opportunities to practice and improve their language skills. They engage in daily interactions in English, both formally and informally, which enhances their fluency and comprehension.

The need to learn English as a foreign language can be attributed to globalization, modernization, the language of research, and accessing global knowledge networks. English in Saudi Arabia is widely used in multiple fields, including business and government activities. Therefore, proficiency in English translates to an increased edge by the Saudi Arabian population to engage with the international community and engage with different communities and cultures that are transforming their culture (Al-Tamimi, 2019, p. 70). Polly et al. (2018) defined the sociocultural perspective of learning as using pedagogies founded on collaborative practice. They added that the sociocultural perspective entails perceiving learning as an undertaking that occurs through interaction and guided discussion. Learning also occurs through collaboration; experience and discourse are the core elements that impact and dictate learning outcomes. EFL educators adopt an approach and framework that simplifies their ability to successfully undertake intercultural communication. It is fair to postulate that learning English as a second language can be quite challenging due to the cultural divide and variation between this Arabic nation and the origin of the English language. However, as Ilkhamova (2022) postulated, sociocultural competence is beneficial in propagating communicative competence. Thus, higher education classrooms are bound to benefit from the ease of navigating multiple cultural settings. Using different languages entails deploying cross-cultural communication, and the role of sociocultural perspectives is that they simplify this undertaking. Hence, these dynamics rationalize the increasing integration of sociocultural perspectives.

Improving teaching methodologies in higher education is crucial to catering to individual students' needs effectively. Contrary to the misconception that higher education does not benefit from customized approaches, it is essential to acknowledge the influence of cultural differences among students and teachers, particularly in higher education settings. While students are expected to adapt easily to their learning environments, it is fair to simplify the learning process through intentional efforts.

Despite the evident benefits of tailored teaching methods, Takrouni and Assalahi (2022) pointed out various challenges faced by educators in implementing these approaches. For instance, they highlighted the resistance encountered when introducing self-assessment practices, despite their potential to enhance learning outcomes. This example underscores the inevitable challenges associated with integrating sociocultural perspectives into education. Recognizing and understanding these challenges is crucial to exploring the full potential of tailored teaching methods. By taking informed approaches and implementing evidence-based measures, educators can promote positive learning outcomes, particularly in higher education classrooms where English is taught as a foreign language.

This topic is both timely and significant in the context of global educational reform and rising interest in culturally responsive pedagogies. While much has been written about sociocultural theory in general, there is a notable gap in research focused on its application within Saudi Arabian EFL higher education settings. This study helps fill that gap by addressing an underexplored intersection: how sociocultural theory can be effectively localized within Saudi classrooms shaped by distinct linguistic, religious, and gendered frameworks. The urgency of this inquiry stems from the increasing demand for English proficiency in the Kingdom's Vision 2030 reform agenda, which positions English as essential for global engagement.

Moreover, this study is empirically grounded in a synthesis of existing literature, drawing on both international and regional research to critically examine pedagogical practices, teacher development, and learner experiences. It also responds to calls for more contextualized understandings of language learning that are aligned with learners' sociocultural realities. By linking theoretical insights with real-world classroom challenges, this investigation not only contributes to scholarly debates but also offers practical insights for EFL instructors and education policymakers.

This study investigates the challenges and possibilities of incorporating sociocultural perspectives into Saudi EFL classrooms by reviewing a wide range of research literature. The analysis explores themes such as current pedagogical practices, teacher preparation, cultural influences, learner identity, technology integration, assessment, and cross-cultural communication. By synthesizing these findings, the study aims to provide insights for educators, policymakers, and researchers seeking to foster more interactive, culturally relevant, and student-centered EFL environments in Saudi higher education.

In brief, this introduction sets the stage for exploring how integrating sociocultural perspectives enhances English language teaching in higher education, especially in Saudi Arabia. It addresses the hypothesis that such integration promotes positive learning outcomes and aims to identify the challenges and strategies for EFL educators. By drawing on sociocultural theory and existing literature, the study seeks to contribute to effective teaching practices in diverse cultural settings.

2. Theoretical Framework

Vygotsky's sociocultural theory (SCT) strongly explains language learning as a cultural practice-based social activity. For Alanazi (2024), learning is a product of intentional interaction and collective activity rather than mental processes. At the forefront of this theory is the Zone of Proximal Development (ZPD), or the area between what learners can do independently and what they can do with assistance from more competent practitioners. The ZPD explains how learners progress from supported to independent performance through appropriate scaffolding in language learning. Scaffolding involves temporary support that is gradually withdrawn as the learners internalize it. The principle of internalization also explores how external social interaction is transformed into internal psychological processes so that language learners can build linguistic knowledge and practices through real communication. Within the higher education context in Saudi Arabia, where traditional pedagogical methods are more likely to dominate, sociocultural theory offers a stimulating alternative focused on collective meaning and cultural-based learning activities.

By placing language learning in sociocultural interactions, SCT argues against the traditional focus on grammatical accuracy and memorization of rules typical in most Saudi EFL classrooms. Instead, it maintains that learners should view language processes as a developmental process of engaging in culturally meaningful activities and constructing identity through language. Furthermore, SCT suggests the importance of mediation through tools of culture, where the language plays a double role as both the medium and object of learning in EFL settings, as per Nouraldeem and Elyas (2014). The theory gives a framework through which the opportunity and limitation of integrating sociocultural views within Saudi higher education EFL settings can be analyzed concerning the intricate interdependence between global educational trends and local cultural values.

3. Historical Evolution of EFL Teaching in Saudi Arabia

How English is taught in Saudi Arabia shows societal and educational changes in the country. According to Al-Seghayer (2014), English was introduced into the Saudi curriculum in the mid-twentieth century due to oil discovery and technological links around the globe that required people to communicate in English. Moreover, English teaching initially focused on grammar and vocabulary translation with a focus on memorization and structure correctness without regard to whether the students could communicate. This approach aligned with the traditional Saudi Arabian educational philosophies, which preferred teacher dominance and knowledge transmission to student independence and critical thinking. Barnawi and Al-Hawsawi (2017) stated that the learning environment began to shift in the late twentieth century as economic globalization heightened the demand for English language skills. Pedagogical innovations, nevertheless, were confronted by entrenched educational practices that preferred the maintenance of cultural identity through traditional teaching methods.

Since the establishment of education expansion programs, universities have gradually incorporated more communicative approaches, with varied implementation from one institution to another. Alzhrani and Alkubaidi (2020) underscored that the beginning of the King Abdullah Scholarship Program in 2005 was an important reform. It allowed many Saudi students to learn Western education styles and helped develop a generation of graduates who understand multiple teaching approaches. In this regard, Khawaji (2022) observed that the Vision 2030 program has accelerated education reforms, emphasizing skills development and international competitiveness, which has raised interest in innovative pedagogies, including sociocultural approaches. Despite these developments, there is still tension between modernization imperatives and cultural preservation concerns, which presents a demanding environment for educational innovation.

4. Current Pedagogical Practices in Saudi Higher Education EFL Classrooms

Modern English as a Foreign Language (EFL) teaching in Saudi universities blends traditional practices with innovative ideas from around the world. According to Alrabai (2016), teacher-centered classes are largely used today, where the teacher assumes the central position of knowledge delivery instead of guiding the students' learning. Teaching largely occurs in the form of lectures, and not much chance is left for students to practice speaking the language or work with their peers. Alsaif (2016) noted that textbooks, potentially imported from Western publishers with insufficient cultural sensitivity, serve as the primary curricular materials, perhaps spanning gaps between instructional materials and students' lived experiences. The assessment practices also reflect traditional interests, with high-stakes testing emphasizing grammatical accuracy and vocabulary memorization at the expense of communicative proficiency or cultural understanding.

Where the students are included, it is more likely to be in the form of initiation-response-evaluation characteristic of traditional teaching instead of real communication. AlHarbi (2018) described that most classrooms have rows of desks facing the instructor, encouraging learners to be passive recipients. The use of technology also differs greatly from school to school, with some universities implementing digital learning platforms while others retain traditional teaching methods. Almohideb (2019) did a study that showed students do not participate much in class discussions. Teachers take up most of the time, and there is no room for students to use language productively. Though this is a common trend, Liton (2012) finds some enclaves of new concepts in the system, which is practically true for those teachers who studied abroad and have different approaches to teaching. Such teachers also apply some elements of communicative language teaching, task-based instruction, or sociocultural theory under their schools' policies.

5. Cultural Factors Influencing EFL Teaching and Learning in Saudi Context

The cultural context of Saudi Arabia greatly impacts the teaching and learning activities of EFL in the higher education setting. Educational philosophy is underpinned by Islamic values and principles that shape institutional policy and classroom practice, according to Elyas and Badawood (2016). Islamic values strongly emphasize respect for authority, which manifests in hierarchical teacher-student relationships that conflict with collaborative learning environments promoted through sociocultural approaches. Further, Alrahaili (2018) stated that collectivist

cultures influence individuals' interactions. Students tend to be loyal to the group and obey their community's rules. Such a group-oriented mentality can facilitate team-based learning and restrict individual expression and questioning, which are essential to language learning.

The integration of Western educational approaches in Saudi middle and high schools faces significant challenges due to the enduring influence of cultural and religious values. Alshammari (2016) indicated that even there were numerous government reforms and initiatives aimed at implementing a Western, problem-based learning approach in both Saudi middle schools and high schools, the textbooks used remain distinctly 'Middle Eastern' editions. The introduction of these texts is not an attempt to reject foreign culture but to make it more acceptable to the local population. Clearly, cultural, and religious elements profoundly influence the identity of education in Saudi Arabia. Yet, there is an acknowledgment of the crucial role of English and Westernization in efforts to modernize the society. This dichotomy creates ambiguity, leading teachers to err on the side of caution by limiting student exposure to English and associated cultures, resulting in a general lack of cultural and linguistic competence among young learners (p. 367).

At the university level in Saudi Arabia, the dominance of Western textbooks in English courses creates a stark contrast with local traditions and values, often leading to cultural and ideological conflicts for students. At the university level, the situation differs markedly, with a strong prevalence of Western perspectives. English courses rely almost entirely on U.S. textbooks, which typically overlook Arabic or Islamic culture and sharply contrast with Saudi traditions and values. For instance, first-year English students use "Interactions 1" by Kirn and Jack, published by McGraw-Hill Higher Education in 2002. This book contains many viewpoints that potentially conflict with core Islamic discourses, especially those focused on home and family. A striking example is found in the first chapter, "School Life Around the World," which features an image of a mixed-gender group sitting and conversing. Such depictions of student routines are seen as inappropriate and contradictory within the Saudi context, highlighting the cultural and ideological shocks that Saudi students often encounter (Alshammari, 2016).

Concepts of facial expression and honor influence students' class participation, making most of them afraid to make errors publicly in speaking a language for fear of embarrassment. Nouraldeem and Elyas (2014) stated that boys and girls are taught in most Saudi colleges in different locations, providing male and female students with various learning and interaction methods. Furthermore, Uddin (2017) pointed out that in Saudi culture, individuals tend to pay attention to concealed meanings and comprehend the context. This concept can be quite dissimilar to Western education's emphasis on explicit communication. Memorization and recitation, as part of Quranic learning traditions, are as important as some language learning methods but may conflict with communication- and culture-based approaches. Attitudes toward time and task completion also demonstrate cultural values that may be distinct from the linear study stages used in most Western teaching methodologies. Alghamdi (2014) added that the intergenerational differences are more marked, with younger Saudis tend to be more open to educational change while still holding on to fundamental cultural values. Understanding cultural dimensions is essential in embracing sociocultural pedagogy as appropriate rather than imposing foreign approaches without cultural sensitivity.

6. Teacher Preparation and Professional Development for Sociocultural Approaches

Teacher education courses and professional development activities are essential to facilitate EFL teachers' acquisition of knowledge and skills in using sociocultural approaches. Presently, Alkhairi (2023) argued that most Saudi EFL teachers undertake teacher education courses focusing on language knowledge and pedagogy without giving adequate attention to the sociocultural aspects of language teaching. Pre-service training emphasizes English language skills and grammar over knowledge or cultural awareness. If training is offered for teaching, Abahussain (2016) suggested that it typically provides teaching as technical practice instead of theory-informed practice. This knowledge prevents teachers from adapting their methods to suit their conditions. Furthermore, professional development activities for current teachers usually come in the form of short workshops that show new approaches but do not offer long-term support for using, reflecting on, or adapting them.

Teacher educators often lack experience with sociocultural approaches, further perpetuating traditional teaching by modeling them even when teaching new practices. Almuhammadi (2024) emphasized that this way of working distinguishes between learning about sociocultural perspectives in theory and applying them within the classroom. Furthermore, Massri (2017) reported limited sociocultural studies in Arabic, making it difficult for poorly English-speaking teachers to access theoretical concepts. Professional learning communities that help teachers work together on new teaching strategies are still rare in most Saudi universities. This limited support prevents teachers from getting help when they try new teaching methods. Despite these challenges, Alanazi (2024) showed areas of improvement. Greater numbers of Saudi teachers go abroad for master's degrees and come back with new ideas and methods of teaching. Where teachers do attempt to implement sociocultural practices, they may receive minimal institutional recognition or reward, as assessment systems work to reward standardized products rather than process-oriented teaching innovations.

7. Learner Characteristics and Expectations in Saudi Higher Education

Saudi university students bring distinct characteristics and expectations to their EFL learning experiences, influenced by past experiences of learning and overall sociocultural considerations. As Alrashidi and Phan (2015) noted, most students enter the university with intensive exposure to English instruction but limited communicative competence, reflecting the grammar-based and exam-oriented secondary education. As Abdelhalim and Alqubayshi (2020) explained, Saudi university students' motivational orientations are likely to be instrumental in securing career advantages rather than integrative in seeking to become members of English-speaking groups, influencing their engagement with culture-oriented language activities. Their past learning histories have typically emphasized teacher control and transmission of knowledge, which can foster resistance to the active participation and collaborative sense-making required in sociocultural approaches.

Further, the application of proper linguistic skills and competencies equips the learners with the right sociocultural proficiencies that help in shaping social orientation practices. According to Almuhammadi (2024), equipping students with the right sociocultural practices sharpens how they apply them in culturally diverse settings. Their study patterns likely encourage memorization approaches sufficient for examination success but not the meaning-negotiation approaches adequate for communicative development. Digital literacy levels also vary significantly among the learners, which affects their engagement in technology-facilitated sociocultural learning activities. Moreover, students will likely arrive with expectations of explicit instructional direction and obvious assessment standards that conflict with socio-culturally based pedagogy's more open-ended, process-oriented nature. Regional origin, tribal affiliation, and socioeconomic status create diverse positionalities in the classroom that influence patterns of participation and group dynamics. Despite the obstacles, Alshuraiaan and Almekhleh (2023) observed that contemporary Saudi university students increasingly exhibit evidence of exposure to global perspectives through social media and international entertainment; therefore, they may be more receptive to culture-oriented language teaching practices. Most of them also express dissatisfaction with conventional language learning that has not served to improve their communication skills despite years of study.

8. Institutional Policies and Support Structures

Institutional frameworks significantly influence the implementation of innovative pedagogical practice in Saudi higher education EFL contexts. As Barnawi and Al-Hawsawi (2017) stated, university regulations regarding curriculum design, evaluation processes, and teaching delivery will, by nature, reflect centralized decision-making that limits individual teacher autonomy. Curriculum documents typically specify content coverage and learning outcomes without referencing the pedagogical process, which may create disconnections between sociocultural teaching practices and mandated curricular requirements. Class schedules follow traditional patterns with few classes weekly, which lowers the potential for more interaction and group work needed in sociocultural approaches. Classrooms often have fixed seating aimed at lectures instead of flexible seating to allow different types of interactions.

Faculty evaluation systems also tend to emphasize student satisfaction and achievement scores that may not reflect the value of teaching approaches considering sociocultural issues. Alrashidi and Phan (2015) mentioned that

assessment policy emphasizes standardized testing of how well one performs in certain language tasks. Such emphasis can undermine collaborative learning and knowledge of language acquisition in a social setting. This strategy is particularly crucial when students adjust to new teaching approaches. Support for teaching innovations differs at each school. Some colleges are open to trying new things, while others are traditional in instructional methods. Resource allocations influence teachers' use of technology, physical materials, and professional development to use sociocultural practices effectively. Additionally, department culture and expectations from peers can exert informal pressures that support or limit innovations in breaking usual instructional practices.

9. Technology Integration in Socio-culturally Informed EFL Instruction

There is huge potential for digital technology to take language learning outside of the classroom. However, there are also challenges in Saudi higher education. Online systems, as Alanazi (2024) stated, can provide virtual communities through which EFL learners can interact with different English speakers. They can thus interact with people from all places and be exposed to other languages and cultures. Social media applications enable individuals to join actual conversation groups, allowing students to observe and gradually learn to speak like target language speakers. Collaboration tools enable individuals to collaboratively create language artifacts, supporting the mutual support valued in sociocultural approaches. Media using various forms of representation address multiple learning styles and make cultural material more accessible through images and sounds. Virtual reality and simulation technology deliver interactive cultural experiences that would otherwise be unavailable, perhaps expanding intercultural sensitivity and pragmatic ability. Asynchronous communication technologies permit greater processing time for language production, which is most beneficial for learners transitioning from traditional instruction.

However, technology integration has numerous challenges in Saudi contexts, including infrastructure constraints in certain institutions, uneven digital literacy among students and faculty, and concern over culturally insensitive content. Pedagogical hurdles to adoption include ensuring technology usage to fulfill useful communicative functions instead of digitizing traditional exercises. As AlHarbi (2018) noted, instructors' comfort and competence in utilizing educational technology are essentially disparate, influencing the quality of learning activities in the use of technology. Despite such challenges, Alzhrani and Alkubaidi (2020) explained that the strategic blending of appropriate technologies has abundant potential to lead sociocultural dimensions of language acquisition out of traditional classrooms' spatial and temporal constraints to more effective language development environments. Additionally, assessment of activity in online language learning challenges testing systems conventionally, potentially inducing disarticulation between innovation in practice and institutional mechanisms of accountability.

10. Assessment Practices and Sociocultural Perspectives

Saudi EFL tertiary testing practices present challenges to implementing sociocultural paradigms, as dominant testing practices go against some of the most widely used sociocultural principles of language development. Alrashidi and Phan (2015) discussed that typical Saudi university testing centers on isolated performance on decontextualized language tasks instead of sociocultural accounts of learning as being distributed among social interactions. Test tools prefer correct vocabulary and careful grammar over communication skills or cultural sensitivity. Test tools should not promote limiting notions of language capability. Scorable objective test structures like multiple-choice and true-false are drafted (Alkhairi, 2023). They do not adequately portray the sophistications of language performance in sociocultural contexts. Furthermore, assessment activities rarely incorporate real materials or contexts in which language is indeed utilized in usable cultural environments or community settings. Rather, existing linguistic standards are more commonly applied as the assessment measure, focusing on overall standards rather than advancement on an individual basis or quality of involvement within the learning community. Even where group work is being evaluated, tools face challenges in balancing individual responsibility and reward for group effort with a cultural bias towards collectivism. In addition, Massri (2017) explained that students' understanding of the assessment process is inclined towards getting a mark rather than developmental feedback as guided by education socialization that emphasizes products over learning processes. Almohideb (2019) noted that institutions have begun employing portfolio and project-based assessments according to sociocultural principles, although the quality of implementation varies extensively based on instructor training and institutional support.

Dynamic assessment practices that integrate assessment with teaching employing dialogic interaction are still rare despite having a good theoretical fit with sociocultural orientations.

11. Identity Formation and Language Learning in the Saudi Context

Construction of identity is relevant in language acquisition processes, particularly when viewed through sociocultural perspectives that site learning as engagement within communities of practice. Learning English for Saudi university students involves a multidimensional negotiation between international English identities and Saudi identities underpinned by Saudi culture and Islamic values, as per Nouraldeen and Elyas (2014). Students navigate tensions between global connectivity needs and concerns about cultural authenticity and develop hybrid identities that combine global engagement with local belonging. As emphasized by Elyas and Badawood (2016), gender identities strongly influence language learning experiences in the gender-segregated educational environment that is common in Saudi higher education because it reflects different possibilities for participation and anticipated future contexts for the use of language among male and female students. Professional identity aspirations shape motivational dispositions, with technical students often seeing English instrumentally and those in the humanities perhaps connecting more deeply to cultural aspects of language.

The exposure to English materials outside formal education is also influenced by social class, creating disparities in the starting points for learning English at the university. Alrahaili (2018) explained that the use of English in Saudi Arabia varies based on local identities, with students in cosmopolitan cities having different experiences compared to those in more traditional areas. Religious identity provides most students a framework to understand English acquisition, guiding their interests and cultural engagement. Sociocultural approaches in education acknowledge these identity aspects, providing students with opportunities to use language that aligns with their developing self-identity instead of enforcing standardized communication habits. Uddin (2017) suggested that teachers from diverse socioeconomic backgrounds use language activities that support and enhance students' various identities instead of tasks that temporarily set aside important aspects of identity. As such, virtual platforms are commonly chosen for identity expressions, except in classrooms, where there are other creative opportunities for exploring identity.

12. Cross-Cultural Communication Challenges in EFL Classrooms

English teaching and learning in Saudi higher education necessarily entail cross-cultural communication, offering and posing challenges to applying sociocultural approaches. For Aldosari (2013), cultural disparities in communication habits between Saudi cultural norms and those inherent in English language practices cause potential misunderstandings and adaptation issues. High-context communication patterns common in Saudi culture that rely heavily on shared knowledge and contextual cues are likely to counteract the lower-context communication emphasized in most English-speaking contexts. Differences in cultural norms for directness, politeness strategies, and subjects appropriate for discussion influence classroom interaction patterns and responses to instruction. As Alsamani (2014) reminds us, power distance orientations shape relations between students and teachers, and they are willing to engage in the egalitarian patterns of discourse often cultivated in communicative language teaching. Additionally, time-, task-based, and collaborative notions rooted in culture create diverse conceptions of learning activities and assessment requirements. Non-verbal communication differences involving eye contact, physical distance, and gestures also increase the complexities of cross-cultural classroom interaction.

Material references in global English market materials may not align with local culture or require extensive background knowledge beyond what Saudi learners can access. The metalanguage used to discuss culture during intercultural misunderstandings may hinder resolution and learn from arising scenarios. The effectiveness of sociocultural strategies relies heavily on the strong learning relationships established by foreign teachers in Saudi universities, which involve specific challenges in cultural adaptation and student relationships. In this case, Alghamdi (2014) illustrated that Saudi teachers may struggle with certain cultural aspects of English that they have not encountered or fully internalized yet. Moreover, cross-cultural interactions in EFL classrooms offer significant opportunities for developing intercultural competence when reflected upon.

13. Adaptation of Sociocultural Approaches to Saudi Educational Context

To effectively apply sociocultural approaches to Saudi higher education EFL classrooms, they must be adapted to suit the specific context rather than taken as it is. As Alanazi (2024) argued, successful adaptation requires focusing on significant sociocultural values with universal applicability across specific cultural settings and adapting implementation strategies to align with local education practices and values. It begins by recognizing elements of conventional Saudi teaching practices already infused with sociocultural sensitivity, such as conducting education within social settings and identifying the effects of culture on knowledge transfer. Phased implementation of collaborative learning models, along with providing stable instructional support according to student's needs during the transition to new pedagogy, forms the adaptation strategies of the program.

Similarly, scaffolding learners' engagement through organized interaction patterns assists in establishing confidence within communicative tasks without compromising the cultural norms of public performance and face management. As Alrahaili (2018) asserted, introducing artistic elements into learning materials for teaching English in actual Saudi contexts potentially bridges the gap between textbook teaching and students' day-to-day worlds—adaptation results from embedding sociocultural issues in cooperative elements within student and organizational tasks. Besides, students must engage in explicit discussions to understand the rationale for new pedagogies and their connection to meaningful learning outcomes. Furthermore, Barnawi and Al Hawsawi (2017) recommended incorporating Saudi scholarship in language education to support adaptation efforts based on internal cultural knowledge rather than solely relying on external perspectives. This balance in the adaptation strategy gives due attention to the integrity of sociocultural theory while at the same time paying due respect to educational cultures' diversity and the local ownership of pedagogical innovation.

14. Student Engagement and Motivation in Sociocultural EFL Classrooms

The main factors contributing to the success of sociocultural EFL education in Saudi universities are students' motivation and participation. Traditional learning experiences in the mentioned learning institutions often lead undergraduates to passively receive knowledge, resulting in resistance to active involvement, as expected in sociocultural contexts (Al-Seghayer, 2014). Suppose students are not strongly committed to teamwork due to their past focus on individual work, especially in competitive education systems. Abdelhalim and Alqubayshi (2020) also discussed how focusing on goals related to passing exams or advancing in a career can lead students to doubt the relevance of learning activities. However, students' perception of the future utility of English affects their motivation to engage in challenging language tasks and technical subjects. They often question the effectiveness of communicative methodology beyond basic competency. Cultural conceptions of what a teacher or student is or does may initially conflict with the more peer-focused relationships encouraged in much sociocultural classroom practice, requiring sensitive negotiation and frank discussion.

Despite these challenges, research by Massri (2017) indicated that well-implemented sociocultural practices can increase motivation by connecting language learning with rich contexts and communities important to Saudi learners' identity and future aspirations. Activities with real materials reflecting Saudi engagement with global English-speaking communities have more potential for eliciting investment than decontextualized language exercises. Similarly, Alzhrani and Alkubaidi (2020) suggested that technology-enabled projects that generate genuine audiences for students' work attract more effort and engagement than traditional assignments, with the teacher as the sole audience. Group activities that take advantage of pre-existing social connections while gradually adding interaction patterns respect collectivist cultural orientations while developing new participatory skills.

15. Future Directions for Research and Practice

Implementing sociocultural theories in Saudi EFL higher education settings is an emerging field that requires continued research and practice development. Barnawi and Al-Hawsawi (2017) suggested that future research must test the efficacy of some sociocultural theories implemented in Saudi settings beyond general advocacy to provide evidence-based recommendations on practice. Longitudinal learner development studies employing sociocultural pedagogies would inform a lack of evidence on the long-term impact on language capability and

learner identity. Action research by Saudi practitioners employing sociocultural pedagogies would offer specialist insider perspectives that are currently lacking in the literature. Comparative analysis of similar implementations can be compared to investigate contextual impacts on effectiveness across different Saudi institutions.

Observation of implementation practices in line with sociocultural values and institutional requirements will facilitate one of the principal hindrances of implementation. Alzhrani and Alkubaidi (2020) further suggested that extending research on utilizing technology to support sociocultural teaching methodologies in settings outside the classroom would be beneficial. Professional learning communities grounded in sociocultural practices enable teachers to experiment continuously instead of with occasional experiments. A key ingredient for practice development is the generation of teaching materials based on sociocultural principles appropriate to the Saudi context. Khawaji (2022) proposed that curriculum models incorporating sociocultural perspectives systematically into the institution's requirements would scale beyond individual enthusiasts. Second, pre-service teacher training courses will close the gap between theoretical assumptions and practical applications in Saudi contexts to equip future teachers with innovative pedagogical practices.

Thus, sociocultural approaches in Saudi EFL classrooms require a strategic balance between cultural sensitivity and innovation. In Saudi Arabia, the affective aspect of language learning is often neglected even though the possible impact of innovative teaching approaches on students' emotions and learning filters cannot be denied. Teachers must create psychologically safe spaces where students are secure and can express themselves freely without fear of being judged, encouraging them to experiment. In addition, the increasing presence of digital natives among Saudi university students offers a potentially lucrative arena for reconciling traditional values with international views through sympathetically designed virtual interactions. As Alkahtani (2023) pointed out, successfully incorporating sociocultural practices relies on the capability of EFL instructors to relate Western pedagogic ideas with Islamic culture and to modify these in the current Saudi context, termed as 'cultural bridging competence.' Here, effective pedagogical innovation is interpreted as combining the host country's foreign policy strategies with the sociocultural theoretical epistemology and drawing from the rich root of Saudi education history.

16. Conclusion

This study has explored the multifaceted challenges and complexities involved in teaching English in Saudi higher education through the lens of sociocultural theory. The findings, drawn from an in-depth analysis of relevant literature, reveal that while sociocultural approaches offer meaningful pathways for enhancing language teaching, their implementation in the Saudi context is hindered by several interconnected factors. These include rigid institutional structures, limited teacher training in sociocultural pedagogy, culturally rooted perceptions of language learning, and inconsistencies in assessment practices. Furthermore, cultural norms, gender segregation, and student expectations shape classroom dynamics in ways that can either support or obstruct sociocultural engagement.

Addressing these challenges requires a more context-sensitive adaptation of sociocultural principles, grounded in local realities and supported by institutional reform. Teacher development programs must be aligned with sociocultural pedagogies, and assessment methods need to reflect collaborative and communicative learning goals. Additionally, greater integration of technology and culturally responsive teaching practices can help bridge the gap between theory and classroom realities.

Future research should engage more deeply with classroom-based evidence and explore how sociocultural approaches can be meaningfully localized to support Saudi students' language development and identity formation. Ultimately, advancing English language teaching in Saudi higher education demands a holistic understanding of the cultural, pedagogical, and institutional forces at play, and a willingness to innovate within those complexities.

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The Degree of Availability of an Innovative Climate in Global Virtual Universities in Light of the Variables of Incentives and Interest in Employees

Ibrahim Ali Al-Baher¹, Said Mohamed Issa²

¹ University of the People, USA

² Doha English Speaking School (DESS), Qatar

Abstract

This study aimed to identify the degree of availability of an innovation climate in global virtual universities in light of the variables of incentives and employee engagement. The study sample, which was stratified randomly, consisted of (380) faculty members. The descriptive survey approach was used in the current study. To achieve the study's objectives, a questionnaire was developed, and its validity and reliability were verified. The results showed that the degree of availability of the prevailing innovation climate in global virtual universities in light of the variables of incentives and employee engagement was moderate. The study results also revealed statistically significant differences at the significance level ($\alpha \leq 0.05$) due to the gender variable in favor of males. There were no statistically significant differences due to the variable of college type, and no statistically significant differences due to the variable of academic rank. In light of these results, the study recommended that global virtual universities pay utmost attention to the innovation climate, stimulating the conduct of studies and research from time to time to identify the conditions of faculty members working there and the nature of the problems they face at the economic, social, and psychological levels within the university work environment.

Keywords: Global Virtual Universities, Innovation Climate

1. Introduction

Global virtual universities, as institutions dedicated to providing higher education and scientific research services, are receiving great attention from all students worldwide. These institutions are able to provide higher education and scientific research more easily and at a lower cost in terms of time, effort, and money. Virtual universities have also been able to build bridges of trust between themselves and all those who practice learning and experience knowledge in all its aspects. They have worked to provide sources of knowledge and deliver them to students within principles that take into account the quality of education and the high quality of educational services provided, in accordance with the principles of international accreditation recognized worldwide, this has effectively contributed to reducing costs for students and enabling them to obtain certificates that guarantee

employment. The best evidence of this is the distinguished educational outcomes provided by the American University of the People, which has opened up the opportunity for its students to be employed in the most famous international organizations, such as Google and Microsoft, in hospitals, within the fields of business, health, and education. Virtual universities play a major role in the fields of teaching, scientific research, community service, and advancement. This requires those institutions that raise the banner of higher education in societies to ensure an internal environment characterized by positivity, innovation, and creativity, and more effective atmospheres to enable them to carry out their duties and responsibilities towards society, as well as the students who constitute the elite chosen from all classes of that society.

Such a matter requires the university administrations in charge of this type of university to work hard to ensure the stability of the university environment to be an incubator for science and knowledge, so that it provides society with all its economic, social and educational institutions with distinguished competencies, which contributes to raising their level and improving their services. Hence, the importance of achieving an innovative climate in universities, especially virtual universities, becomes clear.

Numerous studies and research confirm that the innovative climate in any organization, with its various dimensions, contributes to highlighting principles that enhance the ability to develop, modernize, and continuously change, ensuring a state of new creation for everything new and not relying on what exists, while emphasizing the importance of preserving the achievements made by the organization so that they can be built upon and ensure their integration with everything new, and working seriously to advance the innovative and creative side of its employees, in a way that contributes to achieving the organization's goals and satisfying individual and collective needs and desires, An innovation climate is defined as the environment or general atmosphere within an organization, institution, or specific community that encourages the process of innovation and creativity. (Al-Baher, 2025)

2. Research Problem and Questions

Any educational institution strives to create an innovative and effective environment in order to achieve the highest levels of productivity, efficiency, and effectiveness. This ensures that it prioritizes everything that enhances the quality of its employees and ensures a high level of interaction, integration, and active participation in fulfilling the duties and tasks assigned to them. Looking at global virtual universities, the researcher noted a weakness in the level of incentives offered to faculty members in particular. This leads to a lack of attention to them, in terms of supporting them with attractive salaries and engaging them in conferences and training courses that contribute to building a system of innovation and creativity within them and raising their professional level. This has contributed significantly to the exclusivity of some employees and the monopolization of their studies and intellectual achievements, while others are not aware of their work and accomplishments.

Such a thing contributes to killing creativity and stifling the state of innovation, which must be clearly evident in higher education institutions, given that these institutions lead society and move it from its status to more advanced levels. This is confirmed by the results of the studies of each of: Jayan (2021), Al-Jar (2023), and Al-Hamad (2022). This study seeks to identify the reality of the innovation climate in global virtual universities in light of the variables of incentives and interest in employees, by answering the following questions:

- Question 1: What is the degree of availability of an innovative climate in global virtual universities, in light of the variables of incentives and employee engagement, from the perspective of faculty members working at these universities?
- Question 2: Are there statistically significant differences at the significance level ($\alpha \leq 0.05$) between the arithmetic means of the study sample members' responses to the degree of achievement of an innovative climate in global virtual universities, in light of the variables of incentives and employee engagement, attributable to the variables (gender, college type, and academic rank)?

3. Significance of the Study

It is hoped that the results of this study will:

- From a theoretical perspective, add a new knowledge base in the field of innovation climate and the methods and mechanisms for activating and leveraging it.
- From a practical perspective, assist in the field and decision-makers and policymakers in higher education by ensuring the stability of the concepts of creativity and innovation within the educational institution, achieving full commitment to its overall objectives, and localizing the principles of creativity and breaking away from convention within the virtual university work environment.

4. Study Terminology

This study included the following terms:

- Global Virtual Universities: These are universities that offer higher education in various disciplines remotely, making it available to all students in all countries of the world, regardless of their nationalities, ethnicities, origins, and ideologies (Jayan, 2021).
- Innovation Climate: The shared sense among individuals about the extent to which their organization encourages new ideas, experimentation, calculated risk-taking, and learning from failure (Al-Baher, 2025).

5. Study Limits

The study limits included the following:

- Human limits: Faculty members at global virtual universities.
- Temporal limits: The academic year (2024/2025).
- Spatial limits: Mid-Ocean University, Islamic University of Minnesota, and Leeds Professional University.

6. Previous Related Studies

This section will include a presentation of the previous studies reviewed, arranged chronologically from most recent to oldest, as follows:

Al-Jar (2023) conducted a study aimed at identifying the relationship between work climate and innovative behavior among administrators in colleges of applied sciences in the Sultanate of Oman. To achieve the study objectives, the researchers prepared two questionnaires. The first questionnaire was about the work climate scale, which consists of 34 paragraphs distributed over seven areas. The second questionnaire was about the innovative behavior scale, which consists of 26 paragraphs. The study concluded that after verifying the validity and reliability of the questionnaire, (224) administrators and administrators from the study community were invited to answer the questionnaire paragraphs. The study used the descriptive approach, and the study concluded that there is a positive correlation between work climate and innovative behavior among administrators in colleges of applied sciences in the Sultanate of Oman. The researchers recommend the following: Developing future plans to nurture innovators, either by holding training courses to enhance their innovative behavior or competitions to motivate them to innovate.

Al-Hamad (2022) conducted a study aimed at revealing the impact of innovation management on the innovation climate through a comparative study of commercial banks in the State of Kuwait and the Kingdom of Bahrain. The descriptive analytical approach was used to collect information from primary sources of literature related to the topic of the innovation climate and its impact on achieving customer satisfaction. Data was also collected from primary sources by developing a scale that serves the study's objectives. It was distributed to members of the study sample, which consisted of (5) banks in the State of Kuwait as well as in the Kingdom of Bahrain. After analyzing the study data, it was concluded that: There is a statistically significant impact of innovation management on the innovation climate, indicating the presence of a statistically significant correlation between innovation management and the innovation climate in the State of Kuwait and the Kingdom of Bahrain alike. It also showed the presence of statistically significant differences attributed to the impact of the region in all areas and in the overall score, and the differences were in favor of Bahrain. The study recommended the need to search for a training program to develop its employees to perform their work to the fullest extent and to provide new methods and technology to facilitate the provision of service to customers, as well as the benefit of commercial banks in the State of Kuwait from the work of commercial banks in the Kingdom of Bahrain, and finally the need for

commercial banks in the State of Kuwait to benefit from the work of commercial banks in The Kingdom of Bahrain aims to achieve higher practice scores in innovation management, which is expected to impact the innovation climate at work, which will impact overall business performance.

Jayan (2021) conducted a study aimed at evaluating the reality of creativity and its impact on the organizational climate in educational institutions to diagnose the most important obstacles to creativity in the work environment. (100) validated questionnaires were distributed to teaching and administrative staff in two governmental and private educational institutions. The questionnaire included the main variables of the research (creativity and organizational climate) and three sub-dimensions for each variable for the purpose of conducting a comparative study between these two institutions. A number of statistical methods were used, including: (arithmetic means, standard deviations, simple correlation coefficient (Pearson), goodness of fit test, and impact test, in addition to tests for two independent, unrelated samples and other statistical methods). The most important conclusions reached by the research were that the management of private educational institutions was better than governmental educational institutions in creativity and organizational climate, due to their adoption of a policy of competition and attraction to increase their financial and human resources. Thus, we conclude that there are more obstacles to creativity in governmental educational institutions than in private institutions because the latter constantly seek to adopt and encourage distinguished energies. The most important thing recommended by the research is the necessity for the administration in these institutions to adopt strategies that are compatible with the reality of education in Iraq, which can help create and encourage creativity and creative people, believing in the impact of creativity on the organizational climate, as all organizations, whether service or production, seek to bring about positive changes from time to time, by investing the components they possess in the optimal way, and the creative human resource is one of the most important of these components on which the research is based.

Hilal (2021) conducted a study that aimed to identify the concept, objectives, and models of virtual university education, in addition to identifying the factors that limit the achievement of the principle of equal educational opportunities in the traditional Saudi university education system, and examining the possibility of achieving the principle of equal educational opportunities in light of virtual university education. The current study derived its importance from the importance of the topic it addressed, as global and Arab trends focused on virtual education, and it is also a formula that helps expand higher education to achieve equal educational opportunities. The study relied on a complex methodology based on the pragmatic viewpoint in obtaining knowledge. It is based on a mixed quantitative/qualitative research design, which is based on the descriptive approach; given that it is compatible with the nature of the study in terms of description, interpretation, and analysis. The study used a questionnaire and interview as tools for data collection, which were applied to a sample of male and female students from some practical and theoretical colleges at Qassim University at the undergraduate and postgraduate levels. The study found that there are multiple models of university education, with varying levels of virtual component. It also found that virtual university education increases equal educational opportunities among learners by overcoming the factors that prevent them from accessing appropriate educational opportunities in the Saudi university education system. The study recommended the importance of implementing various models of virtual university education alongside traditional education to meet the needs of all those seeking educational opportunities that suit their economic, family, and work circumstances, or their geographical distance from university campuses.

The study of Al-Abaadi (2015) aimed to identify the reality of the prevailing innovative climate in Jordanian public and private universities in the central region from the point of view of faculty members. The study sample consisted of (393) faculty members, constituting (8.4%) of the total study population. The results indicated that the degree of the prevailing innovative climate in Jordanian universities was average, as the dimension of relationships and communication came in first place with a high degree, while the dimension of leadership behavior came in last place with an average degree. The results also indicated that there were no statistically significant differences in the total degree attributed to gender, while statistically significant differences were shown in the total degree of the prevailing organizational climate and in the dimensions; organizational structure, decision-making, incentives and rewards, and professional advancement and development, attributed to academic rank, in favor of those with the rank of professor compared to those with the rank of instructor, and the presence of statistically significant differences in the degree of the overall innovative climate and the two dimensions; Morale, incentives and rewards are attributed to specialization, in favor of scientific specializations. It also showed that there are statistically

significant differences in the overall innovation climate and dimensions attributed to the type of university, in favor of public universities.

7. Summary of Previous Studies and the Location of the Current Study

Previous studies were used to identify the appropriate methodology and statistical processes, and to identify the theoretical framework for the study's topics and variables. They also served to construct the study's tool, particularly the studies of Al-Abbadi (2015) and Al-Jar (2023). The current study is consistent with previous studies in reviewing the concepts of the innovation climate, their dimensions, and the extent of their activation in educational institutions, including universities. The current study is similar to previous studies, particularly the studies of Al-Hamad (2022) and Jayan (2021), in terms of the study population. However, it differs from those studies in its focus on studying global virtual universities.

8. Methods and Procedures

The descriptive survey approach was used to achieve the study's objectives.

Study Population: The study population consisted of all faculty members at global virtual universities, numbering (3,270). Table (1) shows the distribution of the study population according to the study variables.

Table 1: Distribution of the community according to the study variables

Variables	Variable	Number	Total
sex	Male	2242	3270
	Female	1058	
Academic Rank	Professor	433	3270
	Associate Professor	676	
	Assistant Professor	1572	
	Lecturer	589	
College Type	Humanity	1941	3270
	Scientific	1329	

Source: QS Foundation, 2024.

8.1. Study Sample

According to Stephen Thompson's equation, the minimum size of a stratified random sample representing the population at a significance level of ($\alpha \leq 0.05$) was calculated, which was (343) faculty members. To account for sample waste and indifference in response, the actual sample size was determined to be (400) faculty members. The researchers distributed the questionnaire to the study sample located at three virtual international universities. (380) questionnaires were retrieved out of (400). Table (2) shows the distribution of the representative study sample, which was extracted according to Thompson's equation according to the study variables.

Table 2: Sample distribution according to study variables

Variables	Variable	Number	Total
sex	Male	283	400
	Female	117	
Academic Rank	Professor	50	400
	Associate Professor	86	
	Assistant Professor	202	
	Lecturer	62	
College Type	Humanity	239	400

	Scientific	161	
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8.2. Study Tool

The study tool was developed by consulting theoretical literature and some previous studies, such as Al-Jar's study (2023) and Al-Hamad's study (2022), to achieve the study's objectives and answer its questions. The study tool, in its initial form, consisted of (30) paragraphs, and in its final form, of (24) paragraphs distributed across two areas: employee care (faculty members), consisting of (17) paragraphs, and incentives, consisting of (7) paragraphs.

To verify the validity of the tool, content validity was applied, as it was presented in its initial form to (9) arbitrators specialized in educational administration, and they were asked to express their opinion on the paragraphs of the study tool in terms of the wording of the paragraphs, and the extent of their suitability to the field in which they were placed, either by approving them, modifying their wording, or deleting them due to their lack of importance. Their comments were taken into account regarding the modification, deletion, addition, and merging of paragraphs, as the number of its paragraphs reached (24) paragraphs.

To verify the stability of the tool, the internal consistency coefficient was used according to the Cronbach Alpha equation to extract the stability of the study tool according to the fields. Table (3) shows the stability coefficients of the tool's fields:

Table 3: Cronbach's Alpha reliability coefficients for the study tool domains

number	Field	Cronbach's alpha
1	Employee Attention (Faculty Members)	0.96
2	Incentives	0.92

Table (3) shows that the reliability coefficients were acceptable. To assess the degree of availability of an innovative climate in global virtual universities, the following scale was adopted: low availability (2.33 or less), medium availability (2.34-3.67), and high availability (3.68 or more).

9. Study Results and Discussion

Results related to answering the first question: What is the degree of availability of an innovation climate in global virtual universities in light of the variables of incentives and employee engagement, from the perspective of faculty members working at these universities?

To answer this question, the arithmetic means and standard deviations were calculated for the responses of the study sample members in general and for each field of study, as shown in Table (4).

Table 4: Arithmetic means, standard deviations, and ranking of the degree of innovation climate in global virtual universities in light of the variables of incentives and interest in employees from the point of view of faculty members

Number	Field	Arithmetic Mean	Standard Deviation	Rank	Availability Degree
1	Employee Attention (Faculty Members)	3.55	0.91	1	Medium
2	Incentives	3.29	1.01	2	Medium
Overall Score				Medium	

It is noted from Table (5) that the degree of availability of the prevailing innovative climate in global virtual universities was average, as the arithmetic mean was (3.37) and a standard deviation of (0.93), and the fields were average. The field of concern for employees came in first place, with an arithmetic mean of (3.55) and a standard deviation of (0.91), and the field of incentives came in last place with an arithmetic mean of (3.29) and a standard deviation of (1.01). As for the paragraphs of each field, the results were as follows:

1. Field of interest to employees (faculty members): The arithmetic means, standard deviations, ranking, and availability degree were calculated for the items in this field, and Table (5) shows this.

Table 5: Arithmetic means, standard deviations, ranking, and degree of availability in the field of interest to employees (faculty members) arranged in descending order

Number	Paragraph	Arithmetic Mean	Standard Deviation	Rank	Availability Degree
5	My colleagues in the department appreciate my efforts.	3.82	0.95	3.82	High
2	The department management allows me to actively participate in department meetings.	3.79	1.04	3.79	High
4	The department management appreciates my efforts in my work.	3.70	1.14	3.70	High
10	The department management is characterized by positive oversight, stemming from its trust in the faculty members.	3.67	1.01	3.67	Medium
3	The department management keeps me informed of what is happening in the department where I work.	3.67	1.01	3.67	Medium
16	The department management respects my perspective when making decisions.	3.62	1.14	3.62	Medium
1	The department management allows me to participate in the department's ongoing development process.	3.60	1.09	3.60	Medium
11	Faculty members in the department are subject to the same evaluation standards.	3.59	1.13	3.59	Medium
14	The department management is keen to ensure the continuity of faculty members' work in the department.	3.58	1.14	3.58	Medium

Number	Paragraph	Arithmetic Mean	Standard Deviation	Rank	Availability Degree
13	The department allows me to participate in (courses, conferences, and seminars).	3.57	1.22	3.57	Medium
6	I am satisfied with the capabilities available to me to carry out my academic duties.	3.55	1.19	3.55	Medium
15	I feel fair in the department where I work.	3.52	1.21	3.52	Medium
17	The department management provides (continuous preparation, qualification, and development) for the academic capabilities of faculty members.	3.48	1.11	3.48	Medium
9	I have the opportunity to receive support from the department management when my workload increases.	3.46	1.12	3.46	Medium
8	My work environment, in terms of space and equipment, makes me feel safe and secure.	3.35	1.15	3.35	Medium
12	The department meets my aspirations, hopes, and ambitions to develop my capabilities.	3.32	1.20	3.32	Medium
7	I am satisfied with The benefits available to me to improve my standard of living	3.17	1.30	3.17	Medium
Overall Score		3.55	0.90	Medium	

Table (5) shows that the degree of availability of an innovative climate in global virtual universities in the field of interest in faculty members was average, as the arithmetic mean was (3.55) and the standard deviation was (0.90). The paragraphs in this field were average, and paragraph (5) came in first place, which reads, “My colleagues in the department appreciate my efforts.” Paragraph (7) came in last place, which reads, “I am satisfied with the privileges available to me to improve my standard of living.” This is due to the conviction of faculty members in one department, and their sincere feeling of the importance of development and modernization of the educational process, and to the ability of the department’s management to provide privileges that match the level of ambition of faculty members in raising the standard of living that they hope to reach, which ensures the advancement of the level of innovation and the achievement of the highest levels of cognitive creativity.

2. Incentives field: The arithmetic means, standard deviations, ranking, and availability degree were calculated for the items in this field, and Table (6) shows this.

Table 6: Arithmetic means, standard deviations, ranking, and degree of availability in the field of incentives

Number	Paragraph	Arithmetic Mean	Standard Deviation	Rank	Availability Degree
1	Moral motivation in the department enhances my performance.	3.57	1.25	1	Medium
3	The department I work in has a positive, safe environment.	3.53	1.19	2	Medium
2	The financial motivation in the department enhances my performance.	3.35	1.29	3	Medium
7	The incentives offered by the department's administration enhance faculty loyalty to the department.	3.27	1.19	4	Medium
5	The department's administration takes into account workload responsibilities when promoting.	3.23	1.15	5	Medium
4	Outstanding achievement is rewarded in my department.	3.08	1.24	6	Medium
6	The department's administration encourages faculty members to propose new incentive systems.	3.02	1.23	7	Medium
Overall Score		3.29	1.01	Medium	

It is noted in Table (6) that the degree of availability of the innovative climate in light of the variables of incentives and interest in employees and prevailing in global virtual universities in the field of incentives came to average, as the arithmetic mean reached (3.29) and a standard deviation of (1.01), and the arithmetic means ranged between (3.57-3.02), and paragraph (1) came in first place, which states “moral motivation in the department enhances my performance.” Paragraph (6) came in last place, which states: “The department administration encourages faculty members to propose new systems related to incentives.” This is due to the ability of the academic administration to express the extent of their appreciation for the achievements made by faculty members, in addition to the high level of moral incentives that contribute to ensuring the availability of creativity and innovation within the university environment. What confirms this is that paragraph (1) came in first place, and paragraph (6) came in last place, which states: “The department administration encourages faculty members to propose new systems related to incentives.” The researchers attribute this to the department’s management’s belief in the type of incentives available, their availability, and their ability to address all the human desires and needs of faculty members.

Results related to answering the second question, which reads: Are there statistically significant differences at the significance level ($\alpha \leq 0.05$) between the arithmetic means of the study sample members' responses to the degree of achieving an innovative climate in global virtual universities, in light of the variables of incentives and employee interest, attributable to the variables (gender, college type, and academic rank)?

This question was answered as follows:

A. Gender variable: Arithmetic means, standard deviations, and a t-test were calculated according to the gender variable, as shown in Table (7).

Table 7: Arithmetic means, standard deviations, and t-test according to the gender variable

Field	sex	Number	Arithmetic Mean	Standard Deviation	T-Value	Significance Level
Employee Attention (Faculty Members)	Male	268	3.65	0.89	3.349	**0.001
	Female	112	3.31	0.89		
	Total	380	3.48	0.89		
Incentives	Male	268	3.36	1.02	2.152	**0.032
	Female	112	3.12	0.98		
	Total	380	3.36	1.00		
Overall Score	Male	268	3.63	0.82	2.559	**0.011
	Female	112	3.43	0.83		
	Total	380	3.53	1.65		

** The difference is statistically significant at the significance level ($\alpha \leq 0.05$)

To determine whether the differences between the averages are statistically significant at the significance level ($\alpha \leq 0.05$), a t-test was applied. The results in Table (7) indicate that there are statistically significant differences at the significance level ($\alpha \leq 0.05$) according to the gender variable based on the calculated (t) value, which amounted to (2.559) and a significance level of (0.011), as the difference was in favor of males, as evidenced by the increase in their arithmetic averages. This is attributed to the circumstances surrounding the working woman who goes beyond her responsibilities within the university to reach the home and family to which she belongs. This is what was confirmed by Al-Hamad's study (2022). Also, material incentives are highly accepted by males, as males are in a position of support for their families and relatives. Therefore, motivation, especially material, appears significantly among males, more than females, especially in global virtual universities.

B. College type variable: The arithmetic means, standard deviations, and t-test were calculated according to the college type variable, and Table (8) shows that.

Table 8: Arithmetic means, standard deviations, and t-test according to the variable of college type

Field	College type	Number	Arithmetic Mean	Standard Deviation	T-Value	Significance Level
Employee Attention (Faculty Members)	Humanity	223	3.52	0.89	-0.757	0.449
	Scientific	157	3.59	0.89		
	Total	380	3.55	0.89		
Incentives	Humanity	223	3.29	1.02	0.059	0.953
	Scientific	157	3.29	0.98		
	Total	380	3.29	1.00		
Overall Score	Humanity	223	3.53	1.64	-1.284	0.200

	Scientific	157	3.63	1.67		
	Total	380	3.58	1.65		

** The difference is statistically significant at the significance level ($\alpha \leq 0.05$)

To determine whether the differences between the averages are statistically significant at the significance level ($\alpha \leq 0.05$), the t-test was applied. The results in Table (13) indicate that there are no statistically significant differences at the significance level ($\alpha \leq 0.05$) according to the variable of college type based on the calculated (t) value, which reached (-1.284) and at a significance level of (0.200), as the difference was in favor of the scientific colleges, as evidenced by the increase in their arithmetic averages, This is due to the prevailing scientific environment in the scientific colleges, in which experimentation constitutes the highest percentage, in addition to the discontinuity of the academic courses undertaken by faculty members in the academic department affiliated with the scientific colleges, which forces them to avoid complexity in communication and interaction with each other on the one hand and with the department administration on the other hand, which makes the department administration more aware of the level of difficulties and obstacles that the faculty member in the department is exposed to, which requires it - the department administration - to care for the faculty member and provide him with the capabilities and allow him to participate in external seminars and courses by nominating the faculty member for such matters, which contributes to raising his academic and living standard.

3. Academic rank variable: The arithmetic means and standard deviations were calculated according to the academic rank variable, and Table (9) shows that.

Table 9: Arithmetic means and standard deviations according to the academic rank variable

Field	Academic rank	Number	Arithmetic Mean	Standard Deviation
Employee Attention (Faculty Members)	Professor	44	3.58	0.95
	Associate Professor	81	3.67	0.96
	Assistant Professor	193	3.56	0.87
	Lecturer	62	3.33	0.86
	Total	380	3.53	0.91
Incentives	Professor	44	3.33	1.09
	Associate Professor	81	3.43	1.00
	Assistant Professor	193	3.29	0.98
	Lecturer	62	3.05	1.04
	Total	380	3.27	1.02
Overall Score	Professor	44	3.61	1.59
	Associate Professor	81	3.69	1.73
	Assistant Professor	193	3.54	1.61
	Lecturer	62	3.45	0.84
	Total	380	3.57	1.44

It is noted from Table (9) that there are apparent differences between the arithmetic means, according to the academic rank variable, as those in the category (Associate Professor) obtained the highest arithmetic mean of (3.69), and those in the category (Professor) came in second place, as the arithmetic mean reached (3.61), and in the last place came those in the category (Instructor), as the arithmetic mean reached (3.46). To determine whether the differences between the means were statistically significant at the significance level ($\alpha \leq 0.05$), a one-way

analysis of variance (One Way ANOVA) was applied, and the results of the analysis of variance came as shown in Table (10).

Table 10: One-way analysis of variance to find the significance of differences according to the academic rank variable

Field	Source of variance	Sum of squares	Degrees of freedom	Mean squares	F-value	Significance level
	Between groups	4.496	3	1.499	1.829	0.141
	Within groups	368.374	349	1.056		
	Total	372.87	352			
	Between groups	5.069	3	1.690	1.646	0.178
	Within groups	233.309	349	0.668		
	Total	238.378	352			
Overall Score	Between groups	3.076	3	0.316	0.633	0.56
	Within groups	295.151	349	0.311		
	Total		352			

** The difference is statistically significant at the significance level ($\alpha \leq 0.05$)

The results in Table (10) indicate that there are no statistically significant differences at the level ($\alpha \leq 0.05$), according to the academic rank variable, based on the calculated F value, which reached 0.633 and a significance level of (0.56), as well as in most areas except for the leadership style area. This may be due to the interest of faculty members who are in the category of professor, assistant professor, and instructor in incentives, material gains, communication, and advisory positions that meet their ambitions and help them develop their abilities and capabilities and enable them to achieve their hopes and professional expectations for promotion and professional advancement. The differences were in favor of the category of associate professor when compared to the category of assistant professor in the field of leadership style.

In favor of the associate professor category when compared with the instructor category in the field of decisions, in favor of the professor category when compared with the instructor category in the field of communication, in favor of the associate professor category when compared with the assistant professor category in the field of technology, in favor of the associate professor category with the instructor category in the field of employee interest, and in favor of the associate professor category when compared with the instructor category in the field of incentives. To know the correlation of differences according to the academic rank variable in the fields, the Scheffe test for differences was used, as shown in Table (11).

Table 11: Scheffe test for dimensional differences attributed to the academic rank variable

Academic rank	Arithmetic mean	Professor	Associate Professor	Assistant Professor	Lecturer
		3.58	3.54	3.69	3.45
Professor	3.45	-	0.954	0.955	0.710
Associate Professor	3.66	0.947	0.497	-	0.256*
Assistant Professor	3.51	0.951	-	0.497	0.835
Lecturer	3.39	0.685	0.835	0.256	-

The difference is statistically significant at the level ($\alpha \leq 0.05$)

Table (11) shows that the difference favors the Associate Professor category when compared to the instructor category.

10. Recommendations

Based on the previous results, the researchers recommended the following:

1. University administrations should prioritize the issue of the innovation climate by studying the conditions of their faculty members and periodically identifying the nature of their economic, social, and psychological problems specific to the university work environment.
2. University administrations should work to strengthen systems of material and moral incentives, value superior effort, and reward outstanding achievement.
3. Hold conferences, seminars, and periodic meetings between university senior administrations on the one hand and faculty members on the other to identify their issues and listen to their opinions and suggestions.

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A Critical Review of Quality Assessment Systems for Private Universities in Mainland China

Xuan Zhao¹, Chaocheng Zhou², Xuqing Xu³

¹ The Non-governmental Higher Education Institute of China, School of Public Affairs, Zhejiang Shuren University, Hangzhou, Zhejiang, China

² The Non-governmental Higher Education Institute of China, School of Public Affairs, Zhejiang Shuren University, Hangzhou, Zhejiang, China

³ The Non-governmental Higher Education Institute of China, School of Public Affairs, Zhejiang Shuren University, Hangzhou, Zhejiang, China

Correspondence: Xuan Zhao, School of Management, Zhejiang Shuren University, Hangzhou, Zhejiang, China. Tel:86 -13482640049. E-mail: zhaoxuan1117@163.com

Abstract

China's private undergraduate institutions are undergoing a strategic transformation period, transitioning from scale expansion to connotative development. The deepening development of their evaluation system is accompanied by the launch, establishment, improvement, and upgrading of the national private undergraduate teaching evaluation, reflecting the process of modernization of higher education governance. The current national policies involve the evaluation of private undergraduate institutions. Local evaluations focus on the annual inspection of these institutions, and third-party evaluations are also active. However, the evaluation of private undergraduate institutions still faces three significant challenges: the applicability of evaluation standards, competition over evaluation elements, and structural difficulties in evaluation. The scientific and applicability of the evaluation index system for private undergraduate programs have attracted much attention, and communication between the research team and the evaluation team is urgent. The construction of a high-quality development evaluation system for private undergraduate colleges warrants careful consideration.

Keywords: Private Undergraduate Institutions, High-Quality Development, Evaluation System, Third-Party Evaluation, Classification and Hierarchical Evaluation, Mainland China

1. Introduction

Private undergraduate institutions in China, commonly referred to as private regular undergraduate colleges, constitute an essential part of the nation's higher education system. These institutions are established by enterprises, social organizations, or individual citizens using non-governmental funding sources, and they offer educational programs at vocational, undergraduate, and graduate levels. This category includes both independent private higher education institutions and independent colleges (The Central People's Government of the People's Republic of China, 2021a; 2021b).

As of June 2024, mainland China hosts 799 private colleges and universities, representing 27.6% of all regular higher education institutions. Among these, 410 are private undergraduate institutions. Hebei Province leads with the highest number (35), followed by Jiangsu (28), Shandong (21), Liaoning (20), Zhejiang (19), Hubei (18), Shaanxi (17), Hunan (14), Anhui (13), and Guangdong (13).

The quality development of private undergraduate colleges holds significant importance for China's education system, impacting both institutional sustainability and national educational advancement (Zhu & Song, 2011). Academic research on evaluation systems for these institutions has evolved from focusing on quality assurance to embracing comprehensive quality development frameworks (Xiao & Chen, 2004).

2. Evolution of Private Undergraduate Teaching Evaluation within the National Framework

The assessment of private undergraduate education has been an integral part of China's development of the higher education evaluation system. Under the national private undergraduate teaching evaluation framework, this evolutionary process can be categorized into four distinct phases:

The evaluation of national private undergraduate education has long been integral to the development of the undergraduate education evaluation system, and its development process can be divided into four key stages: initiation, start-up, improvement, and upgrading.

2.1 The Historical Development of China's Undergraduate Teaching Evaluation System (1980-1990)

The establishment of China's national undergraduate teaching evaluation system can be traced back to the 1985 pilot assessment in higher engineering education. During this initial phase, private undergraduate institutions had not yet emerged in mainland China.

The regulatory framework took shape in 1990 when the former State Education Commission promulgated the "Interim Provisions on the Evaluation of Higher Education Institutions," establishing China's first comprehensive policy framework for assessing higher education quality. By 1994, the National Education Commission had begun implementing systematic undergraduate teaching evaluations nationwide.

A parallel development occurred in 1994 when Huanghe University of Science and Technology (established in 1984) became mainland China's first private institution authorized to offer junior college diploma programs following the implementation of the Reform and Opening-up policy. This milestone represented the formal inclusion of private higher education (at the junior college level) into China's national education system. However, due to the scarcity of private institutions during this period, they were not initially incorporated into the undergraduate teaching evaluation pilot programs.

2.2 The establishment of the national undergraduate teaching evaluation system (2000-2010)

In 2000, Huanghe University of Science and Technology was further approved to implement undergraduate education, becoming the only private ordinary undergraduate university in the Chinese Mainland at that time. In 2002, the Ministry of Education implemented a reform of the evaluation system, integrating the existing systems of qualified evaluation (for newly established undergraduate colleges), excellent evaluation (for key construction universities), and random level evaluation (for intermediate-level universities) (Gu, 2012). In 2004, the Ministry of Education passed the "Undergraduate Teaching Level Evaluation Plan for Ordinary Higher Education Institutions," which focused on the three-dimensional alignment of "school positioning and social needs," "talent cultivation goals and implementation effectiveness," and "resource input and quality output" (Ministry of Education of the People's Republic of China, 2004). The evaluation conclusions were refined into four levels: excellent, good, qualified, and unqualified. It advocated that universities should base themselves on regional development reality, give full play to comparative advantages, condense their educational characteristics, and construct differentiated development paths, marking the standardization of evaluation standards (Ministry of Education, 2004). The establishment of the Higher Education Teaching Evaluation Center of the Ministry of Education in the same year marked the formation of a normalized evaluation mechanism. From 2003 to 2008, the "five-year round" evaluation of the teaching work level of ordinary colleges and universities marked the first large-scale evaluation practice in the Chinese Mainland and initiated efforts to incorporate private colleges and universities into the unified evaluation system. Among the 592 undergraduate universities evaluated, only two private undergraduate universities, Sanjiang College (2007) and Huanghe University of Science and Technology

(2008) were included and became the first batch of private universities to pass the national undergraduate teaching evaluation.

2.3 National Undergraduate Teaching Evaluation Classification Improvement (2008-2021)

The second round of undergraduate teaching evaluation, initiated in 2008, comprehensively assessed all 40 private undergraduate institutions in Mainland China at that time. Later, the Ministry of Education of the People's Republic of China (2011) introduced the "Opinions on Undergraduate Teaching Evaluation in Ordinary Higher Education Institutions," establishing a "Five-in-One" evaluation framework and advocating for "implementing classified institutional evaluation of higher education institutions to enhance their distinctive characteristics." While the classified guidance approach for private colleges has gained official approval, its implementation remains in the exploratory phase. Several private universities, including Zhejiang Shuren University (2011) and Xijing University (2017), have successfully undergone this classification evaluation.

The evaluation standards were further standardized through supporting documents issued in 2012, namely the "Implementation Measures for the Qualification Evaluation of Undergraduate Teaching Work in Ordinary Higher Education Institutions" and the "Index System for the Qualification Evaluation of Undergraduate Teaching Work in Ordinary Higher Education Institutions." These documents helped establish the framework for a new round of evaluation plans. Subsequently, Xijing University (2017), Sanjiang University (2018), and Huanghe University of Science and Technology (2018) have all successfully passed the Ministry of Education's undergraduate teaching work audit and evaluation.

2.4 National Undergraduate Teaching Evaluation: Optimization and Upgrading (2021-Present)

Since 2008, private undergraduate institutions have been fully integrated into China's national teaching evaluation system. This evolution demonstrates significant progress in both evaluation scope (from single to multiple dimensions) and operational methodology (from extensive to refined approaches).

The 2021-2025 evaluation cycle, outlined in the "Implementation Plan for Undergraduate Education and Teaching Review and Evaluation," introduces substantial reforms to address previous limitations. Key innovations include a classification framework, evaluation methodology, and strategic development (Ministry of Education of the People's Republic of China, 2021a; Yu, 2023). The enhanced classification framework introduces specialized indicators for private institutions, including the first-time incorporation of "Party-building guidance" as a political evaluation criterion, along with characteristic observation points covering funding allocation and industry-education integration. The evaluation methodology implements value-added assessment focused on student growth and employment outcomes, while governance modernization emphasizes collaborative mechanisms among boards, academic committees, and faculty councils. Strategic development aspects include medium- to long-term planning for private higher education, with precise institutional positioning and identification of advantages. Technological integration features big data applications for real-time monitoring of 18 core indicators, quality culture incorporation into leadership assessment systems, and pilot programs for credit system and academy system reforms. The 2025 implementation of this comprehensive framework marks a new era of quality-driven development in China's higher education assessment system. The 2025 implementation of this enhanced evaluation framework marks a new era of quality-driven development in China's higher education assessment system.

3. Current situation of classification evaluation of private undergraduate colleges

3.1 Types of evaluation for private undergraduate colleges

After decades of unremitting efforts, private undergraduate colleges have begun to take shape. All sectors of society unanimously agree to conduct evaluations of private undergraduate colleges, but opinions vary on the elements to be evaluated (i.e., which aspects to assess). In terms of external assessment, providers are mostly government education regulatory departments and third-party institutions commissioned by the Ministry of

Education. According to the evaluation content, it can be roughly divided into: evaluating the quality of education (such as the quality evaluation of private undergraduate education conducted by the Higher Education Teaching Evaluation Center of the Ministry of Education), evaluating undergraduate education (such as the evaluation of undergraduate teaching level in ordinary colleges and universities), evaluating undergraduate degree awarding (such as the "Degree Authorization Point Qualification Evaluation Method" (Degree [2020] No. 25) issued by the Academic Degrees Committee of the State Council and the Ministry of Education)(The Central People's Government of the People's Republic of China, 2022), evaluating scientific research competitiveness (such as the 2013-2016 Scientific Research Competitiveness Evaluation Report of Private Undergraduate Colleges and Universities issued by the China Private Higher Education Research Institute of Zhejiang Shuren University, and the Scientific Research Competitiveness Evaluation of Private Undergraduate Colleges and Universities in Shaanxi Province), and ranking of subject majors (such as ABC) Professional rankings, comprehensive rankings (such as the ABC version of China's private university rankings), alumni association rankings, high-quality development systems for private undergraduate institutions (Xu, Wang, Feng, 2009), evaluation systems for applied private undergraduate education, and so on.

The current evaluation of domestic private undergraduate colleges is divided into national evaluation, local evaluation (including provincial and municipal evaluations), and self-evaluation, based on the scope of the evaluation. At the national level, there is currently no specialized category for evaluating private undergraduate institutions. Instead, like public undergraduate institutions, they are included in the undergraduate education and teaching review and evaluation system of ordinary higher education institutions ("two categories and four types"). Divided by the leading party of evaluation: internal evaluation/self-evaluation system, external evaluation (national evaluation, local evaluation, third-party evaluation). Currently, private undergraduate colleges are undergoing a critical period of transformation, transitioning from scale expansion to the development of their identity. The evolution of their evaluation system reflects the improvement in the governance capacity of private higher education in China (Table 1).

Table 1: Evaluation Types of Private Undergraduate Colleges

Evaluation types of private undergraduate colleges and universities		
Classification basis	Give a demonstration	
I.Scope of evaluation	According to the relationship between the whole and the part:	
	➤ Overall evaluation: Undergraduate Education Teaching Evaluation Applied Private Undergraduate Evaluation ➤ Classification evaluation: Certification evaluation of engineering, medical colleges, and other professionals	
Two Applicability	Applicable to all citizens: Ordinary colleges and universities Undergraduate teaching evaluation	
	Applicable to the private office: Evaluation of applied private undergraduates Public and private separation: Certification evaluation of engineering, medical colleges, and other professionals	
Three Evaluations of stratification	According to the coverage of the evaluation:	
	➤ National evaluation: Audit and evaluation of undergraduate teaching by the Ministry of Education ➤ Local evaluation: The index system of annual inspection, assessment, and evaluation of institutions of institutions run by Beijing citizens; ➤ Independent evaluation: Routine supervision of the quality assurance committee of private undergraduate institutions	
	According to the leading direction of evaluation:	
IV. Object of evaluation	➤ Internal evaluation/self-assessment system ➤ External evaluation (including third-party evaluation)	
	Teaching quality evaluation system of private colleges and universities Assessment system of innovation and entrepreneurship ability of college students in private colleges and universities	Through Internal evaluation or Sequence Most of the three-party evaluations

Evaluation of the effectiveness of professional schools in private colleges and universities
 Teaching evaluation of undergraduate courses in private universities
 Evaluation of intangible asset value of private undergraduate colleges and universities
 Indicators for the evaluation of the level of private undergraduate colleges and universities

3.2 National policies guide the evaluation practice of private undergraduate colleges

China's private higher education sector is undergoing significant reforms in quality assurance under the Implementation Regulations of the Law on the Promotion of Private Education. The government has prioritized establishing a comprehensive quality monitoring framework featuring two key components: an enhanced classification evaluation system and a digital quality monitoring platform. These mechanisms ensure private universities maintain fundamental educational standards while adapting to the ongoing classified management reforms.

The classification evaluation system serves dual purposes: it fulfills legal requirements for standardized management while facilitating institutional development through the "equal emphasis on support and regulation" policy framework. Research indicates private institutions face growing pains in balancing rapid expansion with quality enhancement. The 2017 Quality Report of Private Undergraduate Education in China highlighted the critical need for systemic standard improvements (Higher Education Teaching Evaluation Center of the Ministry of Education, 2017). Subsequent policy documents, including the 2019-2020 Work Points and Education Supervision Reform Opinions, introduced risk warning mechanisms, annual inspection indices, and third-party evaluation systems (Ministry of Education of the People's Republic of China, 2019; Ministry of Education of the People's Republic of China, 2020).

Scholars emphasize that effective evaluation must integrate government oversight, social supervision, and institutional autonomy (Lou, 2020), particularly in key areas like institutional positioning, talent development, and governance (Zhong, 2022). The 2021-2025 Undergraduate Education Teaching Audit and Evaluation Implementation Plan marked a turning point toward quality-first development (Ministry of Education of the People's Republic of China, 2021a). This shift gained further momentum when the 20th CPC National Congress incorporated private education into China's education power strategy (The Central People's Government of the People's Republic of China, 2022).

The 2025 audit evaluation framework introduces a differentiated indicator system comprising seven primary metrics and 40 specific observation points, with an emphasis on practical teaching innovation and industry-academia collaboration. Key quantitative measures include practical teaching expenditure ratios and the proportion of dual-qualified faculty. The current "national leadership-institutional subjectivity-diverse participation" model creates a virtuous "evaluation-feedback-improvement" cycle through dynamic assessment and quality culture development. Graduate tracking and other monitoring methods are transforming private universities from passive compliance to proactive quality enhancement.

3.3 Provincial Evaluation Focused on Private Undergraduate College Inspections

It should be noted that independent evaluation systems for private undergraduate institutions, operating separately from those for public institutions, currently only exist in select provincial-level regions with well-developed private higher education sectors. A prime example is Beijing's annual inspection and assessment index system for private higher education institutions.

The evolution of Beijing's evaluation system demonstrates progressive refinement:

In 2012 (March 15), the Beijing Municipal Education Commission established an initial framework with seven inspection categories (A and B tables) covering institutional basics, academic programs, financial status, and fund utilization (Beijing Municipal Education Commission, 2012).

A significant development occurred in 2022 (January 24) with the trial implementation of a comprehensive index system featuring six primary indicators (including Party building, institutional conditions, and financial management), 29 secondary indicators, and 45 tertiary indicators (Beijing Municipal Education Commission, 2022).

The system underwent substantial streamlining in 2024 (March 6), when multiple municipal agencies jointly revised the framework to 5 primary indicators, 17 secondary indicators, and 29 tertiary indicators, focusing on core operational aspects (Beijing Municipal Education Commission, 2024).

This progressive refinement of evaluation metrics reflects Beijing's commitment to developing a robust quality assurance mechanism for private higher education institutions.

3.4 Third-party evaluation active

In recent years, private higher education in China has experienced rapid development, and third-party evaluation agencies have established a specialized evaluation system for private undergraduate colleges. These evaluation systems provide essential references for the distinctive development and differentiated competition of private universities through a diversified set of indicators.

In terms of the leading evaluation institutions, after 34 years of continuous improvement (1991-2025), Wushulian China University Evaluation has established a dual-track evaluation model that encompasses core dimensions, including talent cultivation and scientific research. The main list of private universities in the soft sciences focuses on examining the overall level of education and research strength, with special attention to the transformation of educational resources and achievements (hhh198709, n.d.). The ABC China Private University Ranking (2025) employs a "three-dimensional nine index" model, focusing on the classification and ranking of characteristic fields (medicine, language, art, and business). The evaluation of language colleges has been enhanced with additional indicators for the development of programs in minority languages.

Zhejiang Shuren University's China Private Higher Education Research Institute, in collaboration with multiple professional research institutions, has released a series of significant research results since 2013, including the "Research Report on the Evaluation of Research Competitiveness of Independent Colleges in China" and other reports (2013-2016) (Zhejiang Shuren University, 2025). The institution's pioneering "Research Ecology Index" evaluation system has made Xijing University a notable example, with its performance ranking as the top researcher for six consecutive years (Zhejiang Shuren University China Private Higher Education Research Institute, 2016). Among them, the research report on the application for a master's degree in Chinese private undergraduate colleges has had a profound impact on the academic community and policy-making.

The current evaluation of private universities mainly focuses on four core areas: educational level and resources (faculty structure, discipline construction, etc.), quality of talent cultivation (key indicators such as employment rate and enrollment rate), research transformation, and social service capabilities (such as high-tech enterprise incubation), and depth of industry education integration (number of school-enterprise cooperation platforms, coverage of practical courses, etc.). Each evaluation agency will make new adjustments in 2025: Soft Science has added the "Industry Education Integration Index" and increased the weight of school-enterprise cooperation to 15%; ABC ranking focuses on comprehensive evaluation of independent private universities; Alumni association ranking refines college classification; The ranking of Wushulian maintains dual core evaluation dimensions of talent cultivation and scientific research.

In the context of the policies of "modernization of higher education" and "high-quality development" in the new era, it is imperative to improve the evaluation system of private undergraduate colleges (Xu & Qin, 2024). According to the requirements of the "Outline of the Plan for Building a Strong Education Country (2024-2035)",

private universities are accelerating their strategic transformation from scale expansion to quality improvement through a combination of policy guidance and independent reform (The Central People's Government of the People's Republic of China., 2021b; Qin, 2025;). By integrating national audit and evaluation, third-party evaluation, and self-evaluation of universities, a scientific quality evaluation system will be established, which will effectively promote the connotative development of private higher education and have significant theoretical and practical value.

4. Evaluation method

The high-quality development evaluation system for private undergraduate colleges is a multidimensional and comprehensive evaluation system designed to objectively and comprehensively reflect the development status and potential for improvement of higher education institutions (Xu, Wang, Feng, 2009). Through scientific and reasonable evaluation methods and result application mechanisms, private undergraduate colleges can continuously improve their educational level and quality, contributing to the modernization of China's higher education. The basic evaluation methods include: ① Combining quantitative evaluation with qualitative evaluation - using a combination of quantitative indicators (such as teacher-student ratio, number of scientific research achievements, etc.) and qualitative descriptions (such as explaining the school's educational philosophy, campus culture, etc. in the overall report) to comprehensively and objectively reflect the development status of the school. ② Combining internal and external evaluations - encouraging schools to establish self-evaluation mechanisms, conduct regular internal audits, and continuously improve; At the same time, third-party evaluation agencies are introduced for external evaluation to ensure the objectivity and impartiality of the evaluation results. ③ Combining dynamic evaluation with static evaluation - not only focusing on the current development status of the school but also emphasizing the evaluation of the school's development trends and potential. Through dynamic monitoring and comparative analysis, it provides a scientific basis for the school's future development.

5. Evaluate Applications

The application of evaluation results from private undergraduate colleges is primarily reflected in the following four aspects: systematic optimization of the evaluation process, feedback on evaluation results, policy regulation function, information disclosure, and social participation.

5.1 Systematic optimization of the evaluation process

Establish a full cycle management process of "evaluation feedback rectification review," generate exclusive diagnostic reports for private colleges through quantitative indicator analysis (such as faculty structure, employment quality, research conversion rate, etc.), and combine the problems presented in the evaluation (such as the degree of characterization of evaluation indicators for evaluation details, the applicability of evaluation indicators, the scientific discussion of evaluation methods, and the improvement of evaluation reliability and validity), continuously improve and optimize in practice, and establish an observable, testable, verifiable, and sustainable regular evaluation system for private undergraduate colleges.

5.2 Feedback on evaluation results

The evaluation results will serve as a crucial basis for providing feedback to various private undergraduate colleges, enabling them to accurately identify shortcomings and deficiencies in their school operations and formulate targeted improvement plans to promote ongoing improvements in education and teaching quality.

5.3 Policy regulation function

The education administrative department can formulate relevant policies based on the evaluation data, and the government and education regulatory departments can adjust the policy orientation such as dynamic financial support and professional setting approval according to the evaluation results, providing differentiated resource support for the development of colleges and universities, guiding and supporting the high-quality development of

private undergraduate colleges and universities, and promoting the optimization and upgrading of the ecology of private higher education.

5.4 Information Disclosure and Social Participation

By establishing a system for publicizing evaluation results, we not only safeguard the public's right to know to strengthen social supervision but also build a platform for dialogue between universities and various sectors of society, enhance society's understanding and trust in private undergraduate institutions, promote positive interaction between schools and society, and form a positive development pattern of "promoting construction through evaluation and promoting linkage through evaluation."

6. Structural dilemma in the evaluation of private undergraduate institutions in China

China has implemented a "two types and four dimensions" review and evaluation plan for undergraduate teaching in ordinary undergraduate institutions, distinguishing between application-oriented and characteristic-oriented institutions. The evaluation is conducted through public participation and evaluation, reflecting sub-items such as quality assurance, governance mechanisms, and resource adaptation across various dimensions and indicators. It cannot be ignored that the current independent evaluation system for private undergraduate programs only exists at the provincial level (such as the annual inspection and assessment index system for private higher education institutions in Beijing). Due to limitations in authority and resources, various evaluation systems for private undergraduate colleges independently developed by research teams have focused more on objective structural difficulties, such as evaluation positioning deviation (unable to demonstrate characteristic advantages), insufficient adaptability of evaluation standard system (limited promotion and radiation of indicators), and single evaluation subject (mostly self-evaluation advocated by private schools), while exploring evaluation principles, evaluation methods, evaluation paths, evaluation operations, evaluation indicators, and evaluation feedback. Therefore, it is urgent to establish a classification evaluation system for private undergraduate colleges with local characteristics through systematic measures such as top-level system improvement, standard system innovation, and evaluation mechanism improvement.

6.1 Doubts about the scientificity and applicability of the evaluation index system

In the development of the evaluation system, it is likely to encounter the dilemma of collective representation versus personalized representation in private undergraduate colleges. Due to limited consultation, there is a lack of sufficient specialized indicators and selectable observation points that can reflect the educational advantages and characteristics of private sister colleges, such as industrial resource integration, satisfaction with market-oriented education services, and modern governance resilience indicators. The design of evaluation indicators lacks sufficient consideration for the collective growth and personalized development of private undergraduate colleges. The advantages and growth potential of various private undergraduate colleges cannot be qualitatively evaluated through the same set of private evaluations, and the evaluation index system lacks persuasiveness and recognition (Lv & Cui, 2025).

6.2 Communication between Research Team and Evaluation Team

Due to limitations in authority, resources, and funding, and to avoid suspicion of athletes serving as referees, the evaluation system for private undergraduate institutions developed by the research team is often questioned: (1) limited vision and experience and a lack of understanding of the work of private undergraduate institutions, especially evaluation work; (2) The selection mechanism for the evaluation expert pool is not perfect enough, and in the future, it should attract more government regulatory agencies, top experts in academia, senior observers in the industry, and international organizations (NGOs) to participate. Therefore, it is impossible to further improve in research, testing, trial, feedback, demonstration, revision, and promotion.

Authors: Xuan Zhao is a research assistant at the Non-governmental Higher Education Institute of China, Zhejiang Shuren University, focusing on private higher education research. Chaocheng Zhou, Dean of the School

of Public Administration at Zhejiang Shuren University, specializes in educational management and research on private higher education. Xuqing Xu, the former president of the Non-governmental Higher Education Institute of China, Zhejiang Shuren University, and the former president of Zhejiang Shuren University, primarily focused on research in private higher education.

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Application of the SOLO Taxonomy in High School Biology Classroom Instruction: A Case Study of Acquiring and Amplifying Target Genes Using PCR

Bo Peng¹, Qunlong Qiao¹, Nan Sun², Ni Yang¹, Yanfang Sun¹, Xinqiang Song¹, Quanxiu Wang¹

¹ College of Life Sciences, Xinyang Normal University, Xinyang, Henan, China

² Experimental High School of Xiuwu County, Jiaozuo, Henan, China

Correspondence: Bo Peng, College of Life Sciences, Xinyang Normal University, Xinyang, Henan 464000, China. E-mail: pengbo@xynu.edu.cn

Abstract

Cultivating students' scientific thinking, improving their core academic qualities, and solving practical problems are crucial to the development of biology education. This study applies the SOLO Taxonomy to the classroom practice of "obtaining and amplifying target genes by PCR," analyses the content of the textbook and the learning situation according to the SOLO Taxonomy, designs the teaching process in line with the development of the students' thinking level, and then evaluates the teaching effect through the experimental research method, comparing the performance of the students under the traditional and the new teaching modes. Then, we evaluate the teaching effect through the experimental research method and compare the performance of students under the traditional and new teaching modes, and find that the SOLO Taxonomy has an important practical value in the teaching of high school biology classrooms. Meanwhile, in the process of teaching practice, it is found that there is a disconnection between the teaching process and the theory caused by teachers' insufficient interpretation of the textbook content. Because of this phenomenon, it is necessary to carry out theoretical training systematically in the future to strengthen the teachers' knowledge of the SOLO theory hierarchical system.

Keywords: SOLO Taxonomy, Classroom Teaching, Biology, PCR

1. Introduction

Under the background of the new curriculum reform, the purpose of high school biology teaching is not only to let students master the relevant theoretical knowledge of the discipline but more importantly, to let students link theory to practice, and constantly improve their ability to analyse, investigate and solve problems, to comprehensively improve the overall quality of the students and disciplinary literacy (Wang, 2023). The SOLO Taxonomy is an important theory focusing on the cognitive development level of students, and it can help

teachers diagnose the degree of cognitive level of learning of students and optimize the design of teaching content. SOLO Taxonomy is an important theory focusing on the cognitive development level of students, which can analyze students' thinking structure from single to multiple, intuitive to abstract, and help teachers diagnose the cognitive level of students' learning and optimize the design of teaching content. In the high school biology curriculum, 'using Polymerase Chain Reaction (PCR) to obtain and amplify target genes' is the core content of the genetic engineering chapter, which is both the hot spot of the college entrance examination and the difficulty in students' learning, and students' understanding of the PCR process has shortcomings because this part of the content is mainly to examine the students' logical thinking and scientific investigation ability. Based on high school biology classroom teaching, this study takes SOLO Taxonomy as the core, designs and implements the teaching process of 'using PCR to obtain and amplify target genes', and selects the classes with the same initial level to carry out the teaching practice through the experimental research method, and then detects whether there is a significant difference between the control group and the experimental group with the help of post-test questions. Then, with the help of post-test questions, we tested whether the control group and verified that SOLO Taxonomy has certain feasibility and effectiveness in high school biology classroom teaching according to the post-test results.

2. Theoretical study of SOLO classification

SOLO Taxonomy is a kind of assessment theory proposed by John Biggs et al. to distinguish students' thinking levels and hierarchical characteristics (Gan, 2024). SOLO is translated as "Structure of the Observed Learning Outcome," which is an abbreviation of "Structure of the Observed Learning Outcome" (Niu, 2023). SOLO Taxonomy is based on the analysis of students' responses to a specific problem, and at the same time, it can classify the level of thinking achieved by students in problem-solving from low to high in five basic structural levels (Tian, 2021). Pre-structural level (P): The student has no understanding of the problem. Unistructural level (U): students have a little understanding of the problem, but only slightly. Multi-structural level (M): students have more understanding of the problem, but are still incomplete. Relational Structure (R): Students have an overall grasp of the problem and can solve the problem independently. Extended abstraction level (EA): students not only have an overall grasp of the problem but also can abstract the problem to make it applicable to new problem situations (Pan, 2020). In summary, SOLO Taxonomy can classify students' thinking level, problem mastery, and problem-solving ability level when solving problems, which provides important theoretical guidance for teachers to design the teaching process link and the evaluation link of classroom practice effect.

In recent years, many scholars have studied SOLO Taxonomy. When students encounter specific problems, it is considered that their levels of thinking can correspond to learning behaviours based on the SOLO classification theory, pointing to different cognitive structures (Su, 2022). A multidimensional view of implicit thought development through the SOLO classification theory and a description of it in verbal words (Fang, 2021). The first three levels of the SOLO classification theory are classified as "quantitative" accumulation, and the last two levels are classified as "qualitative" improvement (Dong, 2022). Identify the mental age stage of the student through the SOLO classification theory to address the realities encountered in the developmental stages (Yan, 2021). Evaluation of students' hierarchy of thinking through SOLO classification theory for the development of points, lines, surfaces, bodies, and systems (Xu, 2023). By analysing the literature on SOLO Taxonomy, this study found that the research involves thinking hierarchy, developmental orientation, structural evaluation, etc., focusing on the practical application of SOLO Taxonomy, which promotes the design and implementation of classroom teaching and can provide a theoretical reference for teaching.

In summary, SOLO Taxonomy focuses on student thinking and is explored in depth in several areas. It links students' learning behaviours and thinking levels and solves teaching problems according to students' psychological age characteristics. It can stratify the thinking structure from multiple dimensions and apply it to the analysis of teaching materials, the analysis of learning conditions, and the design of the teaching process. This theory can accurately grasp the cognitive level of students and solve practical problems, providing a key perspective and practical method for biology education research.

3. The application of SOLO Taxonomy in high school biology classroom teaching

With the deep reform of education and teaching, the research on SOLO theory is no longer limited to the level of thinking and teaching evaluation, test evaluation, and a large number of scholars have also carried out empirical analyses of SOLO Taxonomy in the classroom, specifically in implementation and the actual application of the teaching process.

In mathematics education, SOLO Taxonomy is combined with cardinality teaching to design a cognitive structure diagnostic method that is differentiated and highly suited to the essential characteristics of the assessment content (Hu, 2021). In the development of higher-order thinking in chemistry for high school students, the use of SOLO Taxonomy has optimised the design of teaching and improved the level of students' chemical thinking (Chen, 2022). Based on SOLO Taxonomy, the learning activities of high school English group reading were optimised to efficiently cultivate students' thinking quality, cultural awareness, and learning methods (Jiang, 2024). Through the SOLO Taxonomy in the 'fractions multiplied by fractions' lesson focusing on teaching key points, breaking through the difficult points, and developing students' mathematical thinking level (Hu, 2022). The use of SOLO Taxonomy to guide classroom learning activities makes the design of activities simpler, changes classroom teaching from active learning to interactive learning, and encourages students to realise their thinking progress in task groups or problem chains (Xiang, 2023). In the process of students' language learning, different levels of teaching activities are designed through the SOLO Taxonomy to visualise the development of thinking, which in turn develops students' core literacy (Feng, 2025). Combined with the above examples of scholars applying SOLO Taxonomy to specific classroom teaching, the theory is found to be of practical value for the diagnosis of students' learning situation, optimisation of teaching design, the guidance of the teaching process, and promotion of students' thinking level.

The classroom is an important field for the generation and development of students' thinking (Fan, 2022). High school biology textbook content knowledge points are too fragmented. If, according to the order of the textbook, arranged chapter by chapter, board by board lecture, they often ignore the logical relationship between knowledge. Because teachers face the whole class of students in regular classroom teaching, they cannot adjust the teaching strategy according to the differences in the cognitive level of students, which ultimately leads to insufficient hierarchical teaching. SOLO Taxonomy has the characteristics of spiral and hierarchical (Fan, 2021). According to this characteristic, the knowledge of the chapter to be taught is sorted out according to the relationship of gradual progression from shallow to deep to achieve the function of improving the logical connection between knowledge points. The use of step-by-step explanations and the design of problem scenarios in the classroom can make students' mastery of the content more solid and also enable students to better judge their level of understanding of knowledge. Next, this study will use the SOLO Taxonomy as the basis for the application of high school biology classroom teaching investigation. The purpose of the study is to train teachers to be able to adjust the curriculum promptly according to the differences in the cognitive level of the learners. This will make the context of classroom implementation, the goal system of teaching activities, and the implementation path more systematic and more suitable for the physical and mental development of learners.

3.1 Analysing the content of teaching materials based on SOLO Taxonomy

Textbooks are a kind of important material for teachers to design teaching and improve students' core competence (Hong, 2024). Using SOLO Taxonomy to analyse and integrate textbook content and knowledge points, it can classify them into different thinking levels, help teachers to better sort out the logic and connection of knowledge, and construct a suitable knowledge framework to better enable students to absorb what they have learned.

'The use of PCR to obtain and amplify target genes' is the content of Chapter 3 of the Selective Biology Compulsory 3 of high school biology, "the basic operating procedures of genetic engineering." The content analysis of the 'use of PCR to obtain and amplify the target gene,' the knowledge system of PCR (Fig. 1). This part of the content is the core of genetic engineering operations, not only in the previous section on the 'basic tools of recombinant DNA technology' in the restriction endonuclease, DNA ligase, vector as a tool, but also for

the next section of the ‘construction of gene expression vectors’ steps Provide raw materials - target genes, play a key role in the beginning and the end.

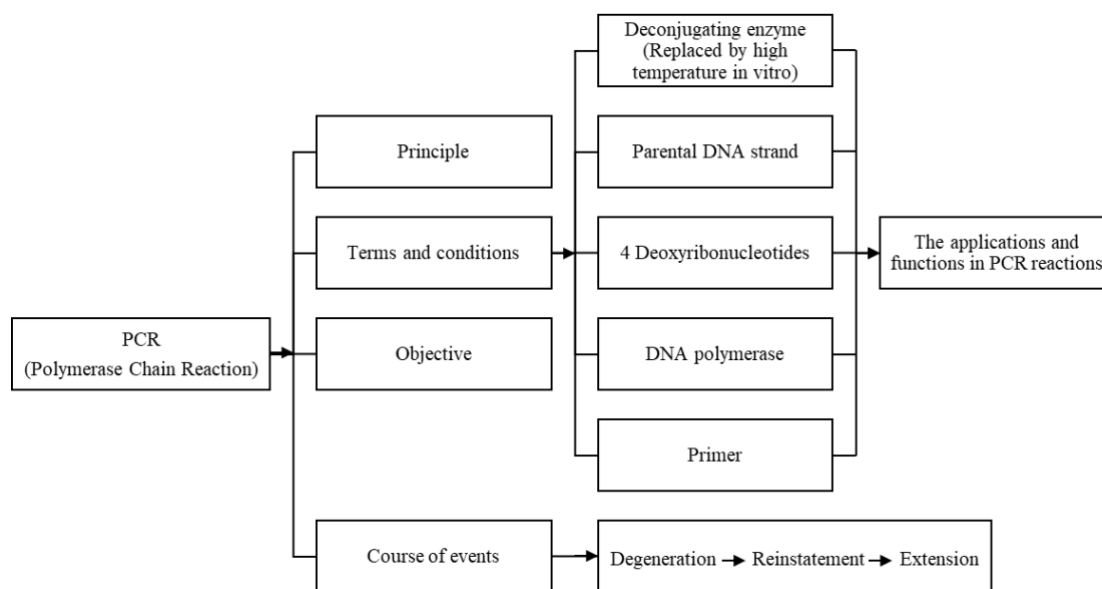


Figure 1: Knowledge structure of “PCR technology”

According to the principle of SOLO Taxonomy, combined with the content of Figure 1, the content of the chapter was analysed and integrated, and the specific analysis (Table 1). According to the hierarchical characteristics of SOLO Taxonomy from shallow to deep, we analyse the teaching materials of ‘obtaining and amplifying target genes by PCR,’ and design the contents of the textbook with different levels of difficulty into a knowledge structure that meets the development level of the students’ thinking, to facilitate the students to complete the progression from a uni-structural to extended abstract structure.

Table 1: Content analysis of biology textbooks based on SOLO Taxonomy

SOLO levels	Biology textbook content
Unistructural (U)	PCR concept, principles, conditions, and objectives
Multistructural (M)	PCR amplification process, role of components in PCR conditions Products of PCR and their quantitative relationships
Relational (R)	The nature of the PCR amplification process Difference and connection between PCR and DNA replication
Extended Abstract (EA)	PCR amplification of mRNA

3.2 Learning situation analysis based on SOLO Taxonomy

Learning situation analysis refers to understanding students and analysing students’ characteristics, to accurately tailor the teaching to the students and effective teaching, which includes the students’ knowledge background, learning attitudes, and psychological state, to predetermine the direction of teaching (Ma, 2023). The core of the SOLO Taxonomy is to construct the hierarchy of thinking levels. Therefore, when analysing the learning situation of students in the class, the overall level and characteristics of thinking should be used as an entry point to determine the starting point and end point of the cognitive state.

According to the SOLO Taxonomy, the content of the section ‘obtaining and amplifying target genes by PCR’ was analyzed. At the high school level, students have learnt about the structure of DNA in Chapter 3, Section 2 of Compulsory Study 2, and their understanding of DNA has changed from abstract and vague to concrete and intuitive, which provides a solid basic knowledge of the target product DNA amplified by PCR. At the same

time through the compulsory 2, Chapter 3, Section 3, students understand the process of DNA replication in the organism, the principle of DNA replication, the conditions required and the specific replication process has a knowledge base, students can better understand the PCR amplification process in this section denaturation, reversion, extension of the role and purpose of denaturation, replication and extension in the PCR amplification process in this section.

Therefore, this section of the content of the teaching should be in the students of DNA in vivo replication has a certain basis, combined with SOLO Taxonomy, gradually put forward different thinking level grade problems, from the original knowledge as the basic lead to new knowledge, to guide the students will be the knowledge of DNA in vivo replication migrate to the use of PCR technology DNA in vitro replication of this part of the contents of the gradual formation of a complete system of knowledge.

3.3 Determination of teaching objectives based on SOLO Taxonomy

Teaching objectives are important indicators pointing to the core literacy of the discipline. Designing teaching objectives is an important part of the instructional design process, as well as the basic work of designing teaching strategies, testing teaching effects, and regulating the teaching process (Li, 2023). Teaching objectives should not only further refine the objectives of the course, but also guide teachers to carry out classroom teaching activities, and at the same time, it is also a reasonable expectation of students' learning outcomes. This expectation should be observable, measurable, and assessable. SOLO Taxonomy is divided into five levels: pre-structural, single-point structural, multi-structural, relational structure, and extended abstract structural, with progressive levels, which identify the structure of the learning outcomes as the ordering from simple skills to complex skills. Based on the SOLO Taxonomy in, determining the teaching and learning objectives should focus on their translation, so that teachers can develop teaching and learning objectives that are in line with the student-centered teaching and learning objectives. These objectives are designed to make it easier for students to understand the material and to guide them in specific ways of learning behaviour. Based on the different levels of SOLO, the content of the textbook is sorted out, the main learning objectives are designed (Table 2), and then the learning objectives are refined into more detailed learning tasks to provide pedagogical guidance for the design of the teaching process.

Table 2: Hierarchical design of SOLO teaching objectives

SOLO levels	Main learning objectives	Main learning tasks
Unistructural (U)	Learn about PCR technology	1. Familiar with the principles of PCR technology 2. Knowledge of the relevant components required for PCR techniques 3. Understanding the purpose of PCR technology
Multistructural (M)	Mastering the process of amplification of DNA fragments	1. Understanding the specific process of amplification of PCR reactions 2. Understand the role of each component of the PCR technique in the amplification process 3. Calculate the number of target genes at the end of PCR amplification
Relational (R)	Using the principle of PCR, diagram the process of triple amplification of the target gene	1. Proficiency in plotting PCR triple amplification processes 2. Difference and connection between PCR and DNA replication 3. Observation of primer binding sites during amplification, direction of sub-strand extension 4. Counting the presence of two strands of equal length in the amplification product

Extended Abstract (EA)	Amplification of mRNA using PCR	1. Construction of PCR-amplified mRNAs
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3.4 Teaching process design and implementation based on SOLO Taxonomy

3.4.1 From pre-structural level to uni-structural level

The content of this section follows the screening and selection of target genes in the first lesson of the 'basic operation of genetic engineering,' and in the design of the teaching process, the acquisition of the *Bt* insecticide resistance protein gene in the previous section is continued as the introduction to carry out the study of this lesson.

Scenario: *Bacillus thuringiensis* has a gene fragment that can express a *Bt* insect-resistant protein, and in the breeding process of transgenic insect-resistant cotton, scientists artificially synthesized the *Bt* insect-resistant protein gene and rapidly amplified the target gene by PCR.

Pre-lesson task: Students independently preview the relevant paragraphs of the textbook PCR technology, understand the principles of PCR technology, the basic conditions required, and the purpose of PCR technology, and think about the question of how scientists can quickly target genes through PCR.

Design intention: Teachers through the scenario information to arouse the interest of students, so that the students of PCR can amplify the phenomenon of the target gene have questions, they read the relevant paragraphs of the textbook with the questions, can be the textbook to the text form of visual display of the PCR principle, conditions, the purpose of the content of the formation of a certain knowledge. This will enable the students to establish the initial knowledge framework of PCR in their minds and complete the progress from the pre-structural level to the uni-structural level.

3.4.2 From uni-structural level to multi-structural levels

Teachers play the video of the PCR amplification process through multimedia, so that students can establish a logical connection between the three independent concepts of the PCR principle, conditions, and purpose through the amplification process. Then the teacher throws out the questions: how do the various components needed for PCR play specific roles in the amplification process? What is the relationship between the products obtained from PCR amplification and the target genes amplified? Students discuss in small groups.

Design intent: The essential difference between a multi-structural and a uni-structural is that students can understand the problem from multiple perspectives, and the latter can interrelate multiple related knowledge points with what they have learned. Therefore, the goal of this stage is to take students as the main body and group as the unit. After students familiarise themselves with the amplification process of PCR through the video, the group will discuss with each other, so that students can explore the roles of deconjugating enzyme, DNA mother strand, 4 deoxyribonucleotides, DNA polymerase and primers from multi-dimensions and discuss the quantitative relationship between amplification products and the number of cycles.

3.4.3 From the level of multipoint structures to the level of relational structure

The teacher draws a diagram of the process of DNA semi-conserved replication on the blackboard (Fig. 2), so that students can analyse the similarities and differences between the in vivo replication of DNA and the in vitro replication of PCR content regarding the conditions and process of DNA, and so that they can draw a diagram of the process of PCR triple amplification on their own, combining the following questions. The teacher asks the following questions before students draw the diagrams: (1) What method is used to amplify DNA in vitro so that the double strand is unwound and the hydrogen bonds are broken? (2) Why are primers needed in in vitro amplification? Answer in the context of the characteristics of DNA polymerase. (3) Where does the primer bind to the base complementary pair of the parent strand? What is the direction of extension of the daughter strand? (4) Observe what are the characteristics of the product DNA after the third cycle is drawn? Are they all double-

stranded, equal-length DNA? (5) Observe the direction of extension of the daughter strand in the plotted amplification product to the lengths of the two single strands in the double strand of DNA, and summarise the differences from the DNA replication product.

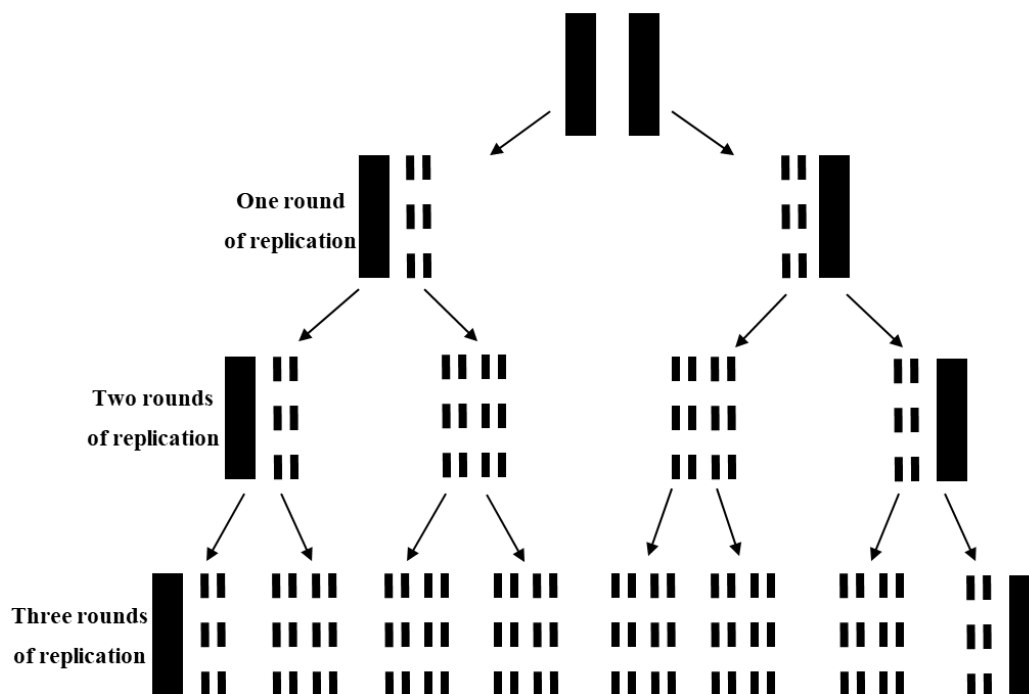


Figure 2: Schematic diagram of DNA semi-conserved replication

Design intent: the level of the relational structure requires that students need to have an in-depth understanding of this section of the course, to establish their knowledge framework in the cognition, and to enable them to use their understanding of knowledge to complete the refinement of the knowledge points of the PCR amplification process, and ultimately draw their independent drawings of the process of the PCR three amplification diagrams. Therefore, at this stage, to enable students to complete the transition from multi-structural to relational structure, students are allowed to summarise the similarities between DNA in vivo replication and PCR in vitro amplification using observing the diagram of the replication process of DNA, and the same time, they can also find out the differences between PCR in vitro amplification and DNA in vivo replication in a more intuitive way. Guiding students to combine the new knowledge learned in this section with the old knowledge, and then the differences between PCR amplification and DNA replication, designing questions from shallow to deep through the thinking level, and listing them on the blackboard by the teacher. So that the students, through the questions led to the conclusion that PCR, although it is a technology based on the principle of DNA semiconserved replication, is not the same as its process. Because DNA polymerase cannot directly link deoxyribonucleotides into a single strand, a small section of short single-stranded nucleic acid that can complementarily pair with the bases of the DNA template strand is needed as a primer in vitro, thus serving as the basis for the unfolding and extension of the daughter strand. Students link the similarities between the two and complete the drawing by supplementing it with a diagram of the process of DNA replication. Eventually, students are guided to observe the characteristics of the PCR products and compare them with the products of DNA replication to find out the differences and get the mathematical model between the number of PCR amplifications and the products, completing the transition from a multi-structural to a relational structure.

3.4.4 From the level of relational structure to the level of extended abstract structures

After the students have completed the drawing of the PCR amplification process and analyzed the phenomenon of the products, the teacher raises the question ‘the target gene amplified by PCR is a DNA fragment with genetic effects, can mRNA be amplified by PCR’, providing the direction for the students to carry out the next round of problem exploration. Under the guidance of the classroom, students review the principle and purpose of

PCR, and make it clear that PCR is based on the principle of half-conserved replication of DNA, and its function is to make a large number of copies of the nucleotide sequence of the target gene, so that students can conclude that PCR can only replicate the fact that DNA.

Teachers ask questions on this basis: What is the relationship between mRNA and DNA? Is it possible to use the connection between the two to amplify mRNA indirectly by amplifying DNA? Lead students to explore the possibility of PCR amplification of mRNA through gene expression-related content.

Because in the implementation of this teaching process, the problem may involve the integration of the contents of multiple textbooks, which is difficult, the teacher needs to set specific tasks to provide students with ideas: (1) Through the analysis just now, what kind of connection is there between DNA and mRNA? (2) PCR can only amplify DNA, not directly amplify mRNA, can it make RNA into DNA? (3) Thinking about the process of question (2), what specific conditions are needed? What steps are needed to carry out the actual operation? (4) Combine the above questions and write a preliminary idea of PCR amplification of mRNA.

Finally, the teacher will show the specific operation steps of PCR amplification of mRNA shown (Fig. 3), and the students will compare, check, and perfect their ideas, draw the correct operation process, and complete the teaching task of this lesson.

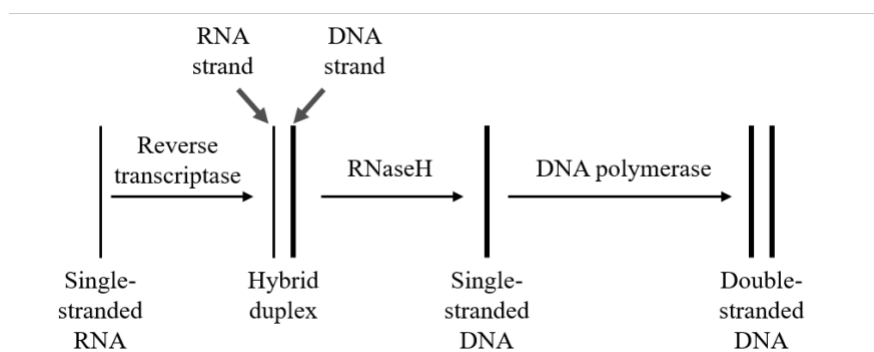


Figure 3: Specific procedure for PCR amplification of mRNA

Design intention: Extended abstract level requires students to be able to connect relevant knowledge to solve practical problems, and at the same time requires them to have the ability to discover the essence of biological knowledge in new problem scenarios. The content of this stage is designed to enable students to master the PCR amplification process based on completing the transfer of the application of this part of the content and be able to reorganise their knowledge framework based on problem scenarios. Because the amplification of mRNA by PCR is a difficult point in the textbook, in the specific teaching, the teacher needs to help students review and connect the existing knowledge system through the presentation of problems to make the students integrate the knowledge and solve the corresponding problems, to achieve the purpose of strengthening the students' innovative ability. In the design process of the task, the core is to let students understand the relationship between DNA and mRNA, by guiding students to review the reverse transcription and the conditions required to lead them to complete the process of reverse transcription, to get the hybrid double-stranded DNA chain, and let them be able to select the DNA chain as the template chain for PCR amplification, to achieve the purpose of the indirect amplification of mRNA, so that the students' level of thinking to complete the transformation of the structure of the correlation to the extended abstract level.

4. Evaluation of the Effectiveness of SOLO Taxonomy in High School Biology Classroom Teaching

4.1 Establishment of teaching practice classes

In this study, the sophomore class 19 and class 23 of the first senior high school in X county are listed as experimental research subjects, through teaching practice, to verify whether SOLO Taxonomy is effective in the high school biology classroom. The class levels of class 19 and class 23 are both at the level of Tsinghua class in the school, with a comparable level of student population and the same teaching progress. The author tested the pre-test paper for the two classes separately and counted the test results.

The preparation of the pre-test paper mainly selected the 'basic tools of recombinant DNA technology' and 'DNA replication' two chapters, the content of the principles of DNA replication, raw materials and steps, and the basic tools of genetic engineering part of the knowledge, is to learn the PCR. It is a pre-requisite for learning PCR. The pre-test questions were used to diagnose whether the students of the two classes were at the same level of thinking and basic knowledge before learning the course 'Acquisition and amplification of target genes by PCR.'

Statistics on the performance of the pre-test yielded a mean difference of 0.92 between the pre-test scores of the two classes (Table 3), while the data were analyzed with the t-test of independence using SPSS27.0, and the significance (two-tailed) was $0.695 > 0.050$, which indicated that there was no significant difference in the degree of mastery of the pre-test knowledge of the practical content and comprehension of the target classes. Therefore, class 19 was set up as the experimental group and was taught in the teaching mode guided by SOLO taxonomy theory; class 23 was set up as the control group and was taught in the conventional mode.

Table 3: Statistics of pre-test performance groups of Class 23 and Class 19

Group statistics				
Class	Number of cases	Average value	Standard deviation	Standard error mean
TotalsControl subjects	51	83.75	13.823	1.936
Experimental group	52	84.67	9.873	1.369

4.2 Evaluation modalities

In this study, to evaluate the application of SOLO Taxonomy more comprehensively, the experimental group and the control group were uniformly tested with post-test questions at the end of the teaching practice. The posttest was developed based on the core concepts of the chapter 'Acquisition and amplification of target genes by PCR,' which was adapted from the core concepts of the proposition statement list prepared by Chen Zhenpeng. The test questions were closely related to the knowledge points of the textbook and conformed to the SOLO Taxonomy level, and the question types included judgment questions, double-choice questions, and fill-in-the-blank questions. Through these three types of questions, the experimental group and the control group were analyzed to verify the effectiveness of SOLO Taxonomy in classroom teaching.

4.3 Analysis of performance on post-test questions

The number of participants in the experimental group and the control group who participated in the testing of post-test questions was 52 and 51 respectively, and the author graded and counted the post-test papers and analyzed the data through SPSS27.0, obtaining the specific data (Table 4), to verify whether there was a significant difference in the performance of the experimental group and the control group.

Table 4: Statistics of post-test performance groups of the control group and the experimental group

Group statistics				
Class	Number of cases	Average value	Standard deviation	Standard error mean
TotalsControl subjects	51	59.0784	19.67826	2.75551
Experimental group	52	67.4615	18.91411	2.62292

From the data of post-test scores, it can be seen that the post-test means of the experimental group and the control group were 67.46 and 59.08, respectively, and from the mean, the experimental group was higher than

the control group by 8.38, which indicates that there is a certain gap between the two classes. Meanwhile, the independent samples t-test was conducted on the post-test scores of the experimental and control groups, and the significance (two-tailed), which is the p-value for detecting whether the difference between the data of the control group and the experimental group is significant or not, was shown to be $0.030 < 0.050$, which indicates that the post-test scores of the two classes conformed to the level of significance difference.

Table 5: Response styles allowed in SOLO post-test questions

Types of reaction styles		Proportion of various reaction styles	
		Control group	Experimental group
Permitted response styles	[0,0,0,0]	3.9%	3.8%
	[1,0,0,0]	31.4%	15.4%
	[1,1,0,0]	15.7%	9.6%
	[1,1,1,0]	13.7%	11.5%
	[1,1,1,1]	13.7%	32.7%

In this study, to further verify the effectiveness of SOLO theory in high school biology classrooms, the author classified the post-test answers of the experimental group and the control group with the help of Gottman's scale, classified the students' answers into response styles, and calculated the proportion of class size accounted for by each response style (Table 5). From the table, it can be seen that the experimental group conformed to the SOLO classification structure of the total of five response styles, with a proportion of 3.8%, 15.4%, 9.6%, 11.5%, and 32.7%, respectively, and the proportion of the five reaction styles in the control group is 3.9%, 31.4%, 15.7%, 13.7%, and 13.7%, respectively. Where [0,0,0,0], [1,0,0,0], [1,1,0,0], [1,1,1,0], [1,1,1,0], [1,1,1,1] corresponded to the five structural levels of P, U, M, R, and EA, respectively, in SOLO Taxonomy. As can be seen from the percentage of data of various permissible response styles, the proportion of the experimental group reaching the EA level was 32.7%, significantly higher than that of the control group, 13.7%, which once again verified that the SOLO Taxonomy has a certain practical value in classroom teaching.

5. Conclusions

This study connects SOLO Taxonomy with high school biology classroom teaching, constructs the teaching framework through different levels of SOLO structure, and designs the teaching objectives hierarchically to achieve precise guidance for students' cognitive development level. Practice shows that this model significantly improves the teaching effect in the classroom and increases students' understanding of knowledge, especially in the teaching of PCR experimental operation, DNA replication and other concepts, which is a more significant increase in students' performance than the traditional teaching model, which side by side confirms the practical value of SOLO Taxonomy in biology classroom teaching. However, in the process of teaching practice, it was found that teachers' understanding of the SOLO hierarchical standards, the understanding of the content of the textbook, the allocation of classroom teaching time and other factors have a crucial impact on the teaching effect, and the present study only focuses on a single teaching topic, which is a certain limitation. Subsequent studies can expand the scope and combine it with more teaching content and scenarios to further explore the in-depth integration of the theory with classroom teaching and students' cognitive laws to accumulate more empirical information for the study of the practical application of SOLO Taxonomy in high school biology classroom teaching.

To sum up, applying the hierarchical structure characteristics of SOLO Taxonomy from shallow to deep in classroom teaching can optimise and guide the design of the teaching process, teaching objectives, and content of teaching materials, and provide new ideas and methods for the reform of biology teaching.

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Enhancing Student Writing in Higher Education through ChatGPT: Applications and Implications

Raywat Deonandan¹

¹ Faculty of Health Sciences, University of Ottawa

Correspondence: Raywat Deonandan, Interdisciplinary School of Health Sciences, University of Ottawa, Ottawa, Canada K1H 6N5. E-mail: rdeonand@uottawa.ca

Abstract

This commentary explores the potential of ChatGPT to support and enhance writing skills in higher education settings. While certainly fraught with pedagogical perils, ChatGPT can nevertheless assist in writing processes, improve grammatical and stylistic proficiency, and contribute to academic research skills among university students.

Keywords: Generative AI, Writing, ChatGPT

1. Introduction

The term “artificial intelligence” was coined by McCarthy et al. in 1955. (McCarthy et al., 2006) Upon its release in November 2022, the world’s most recognizable form of AI, ChatGPT, became the fastest growing app in the history of web applications. (Gordon, 2023) Its use among students has become one of the most debated topics among scholars and educators (Imran & Almusharraf, 2023) especially for its ability to accelerate academic fraud and possibly obviate deep language learning. Yet despite its many threats and challenges, the integration of artificial intelligence in educational settings offers numerous opportunities for enhancing student learning experiences. This paper enumerates and discusses ten roles for ChatGPT in higher education classrooms, specifically as an educational and productivity aid for students.

2. Ten Roles

2.1 Writing Assistant

ChatGPT shows its initial impact during the preliminary stages of academic writing, notably in developing ideas, structuring essays, and refining arguments. By leveraging vast textual databases, the AI can assist students in the ideation phase of writing by offering multiple perspectives and arguments on a given topic. This capacity not only

broadens the student's understanding but possibly also enriches their critical thinking skills, enabling a more robust engagement with the subject matter. The scholarly literature is rife with examples of individuals, groups, and projects using ChatGPT and similar generative AI for brainstorming. (Kim et al., 2024) It is worth noting, though, that the quality of “brainstormed” ideas produced by ChatGPT is variable, (Tsufim & Pomerleau, 2024) often requiring several iterations of prompting (2024).

Professional researchers are increasingly using large language models like ChatGPT to generate ideas for investigation and to phrase research questions appropriately. One study evaluated ChatGPT’s ability to generate research ideas for systematic reviews in otolaryngology, (Shaari et al., 2024) and found those ideas to be unique, feasible, and clinically relevant.

Additionally, the structural composition of an essay can be pivotal in academic writing, requiring coherent organization that supports the logical flow of arguments. ChatGPT aids in this process by suggesting potential outlines based on key points derived from user input, acting as a kind of scaffold that students can build upon. This interactive process can help in structuring essays more effectively, ensuring that all relevant points are addressed systematically. AI-guided essay structuring can significantly enhance the logical sequencing of arguments, leading to clearer and more persuasive essays. Additionally, the AI's ability to simulate different argumentative styles can help students to refine their arguments, potentially making them more precise and tailored to academic standards.

The refinement of arguments is another area where ChatGPT can prove valuable. By engaging in dialogue with the tool, students can test the strength of their arguments, receiving immediate feedback on logical fallacies or weak assertions. This kind of iterative hypothesis testing with AI can promote a higher level of argumentative maturity, allowing them to develop more convincing and rigorously defended positions. In this way, ChatGPT does not merely act as a passive tool but as an active participant in the user’s intellectual development.

2.2 Grammar and Style Tutor

ChatGPT's linguistic capabilities enable it to “understand” and apply complex grammatical rules across various contexts. It can identify and correct a wide range of grammatical errors, from basic punctuation mistakes to more sophisticated syntactic irregularities. It provides immediate feedback with real-time corrections, facilitating a learning environment where errors are not just corrected but also explained, thereby promoting a better understanding of grammatical rules.

ChatGPT can also contribute to the stylistic development of student writing by suggesting enhancements that improve clarity, coherence, and overall readability. It can analyze text for stylistic consistency and conciseness, offering alternatives that refine the tone and voice of the writing. For instance, it can suggest variations in sentence structure to avoid repetition, recommend more precise vocabulary to enhance expression, or reorganize paragraphs to ensure a logical flow of ideas. These capabilities are particularly valuable in academic writing, where clarity and adherence to formal style are paramount.

The pedagogical implications are profound. By providing tailored stylistic suggestions, the AI essentially acts as a bridge between theoretical knowledge and practical application. This practical approach not only reinforces learning but, it can be argued, also empowers students to experiment with different writing styles in a controlled environment. It is entirely possible that as tools like ChatGPT become more commonly applied in constructive classroom environments, an overall elevated quality of student writing might be observed.

2.3 Research Aid

The capacity of artificial intelligence systems like ChatGPT to generate summaries and explanations of complex topics represents a significant advancement in both communication and knowledge production. ChatGPT is capable of distilling complicated and involved information into concise summaries and clear explanations. In

educational settings, this functionality can be leveraged by students who grapple with comprehending dense academic texts or complex subject matter.

Moreover, ChatGPT's proficiency in explaining difficult concepts extends the boundaries of traditional learning aids. Unlike static resources, it can interact dynamically with students, adjusting explanations in response to the learner's queries or the level of detail they require.

ChatGPT has been investigated as a tool for explaining complex medical reports to patients. Admittedly, studies have found some issues having to do with inaccuracy of content and inappropriateness of language. (Sun et al., 2024) Outside of medicine, multiple anecdotal reports suggest that generative AI is being used effectively, or at least satisfyingly, as a general explainer of complex ideas and text. (Egger, 2023)

2.4 Revision Tool

ChatGPT can suggest alternative expressions and constructions that not only maintain the original intent and meaning of the text but also enhance its clarity and readability. This can be useful for those who struggle with articulating complex ideas succinctly, or those whose writing may suffer from redundancy or ambiguity.

It is possible, as well, that as students work with the AI to refine their drafts, they are exposed to varied linguistic styles and structures, broadening their rhetorical skills. It is hoped that through continuous interaction with the AI, students can learn how to adjust their writing for different academic and professional contexts, enhancing their overall communicative competence. This is as an aspirational expectation not yet backed by published empirical data.

2.5 Plagiarism Education

Ironically, as the rise of classroom AI presents a sobering challenge to academic integrity, it might also offer something of a salve. AI tools offer the ability to paraphrase content accurately while citing sources appropriately. ChatGPT can provide examples of how to rephrase original texts without altering the intended meaning.

Moreover, ChatGPT can serve as an interactive tool that explores the nuances of citation practices across various citation styles. Whether it is APA, MLA, Chicago, or any other academic citation format, ChatGPT can demonstrate how to integrate citations seamlessly into the narrative of an academic paper.

It must be clear that ChatGPT cannot be relied upon to source its own references accurately. The prevalence of “hallucinations”, or outright fabrications of fictional citations, remains high. (Buchanan et al., 2023) As yet, it can only be used as a tool to avoid plagiarism through appropriate rewording. Though, future evolutions will surely minimize these presently substantial flaws.

2.6 Writing Prompts Generator

ChatGPT's application in generating essay questions and creative writing prompts offers a novel approach to stimulating intellectual engagement and creativity in educational settings. Leveraging its extensive training on diverse textual data, the AI can craft questions and prompts that challenge students to think critically and explore a wide range of themes and topics. This capability is particularly valuable in humanities and social sciences curricula, where the formulation of thought-provoking questions can foster deep analytical thinking and nuanced discussion. By providing a diverse array of prompts, ChatGPT assists educators in catering to a broad spectrum of intellectual interests and learning styles, potentially increasing student motivation and engagement with the material.

Furthermore, the flexibility of ChatGPT in adapting to different academic levels and subjects allows for customized learning experiences that can be tailored to the specific needs of the classroom. Whether generating prompts for introductory courses that require basic understanding and analysis or for advanced classes that demand

complex argumentation and critical thought, ChatGPT can be programmed to vary the complexity and focus of the questions accordingly. This adaptability not only makes it a useful tool for educators in designing their syllabi but also enhances its utility in promoting differentiated instruction. Through its capacity to create targeted prompts, ChatGPT facilitates a pedagogical approach that is both inclusive and challenging, accommodating diverse student backgrounds and academic capabilities.

The role of ChatGPT in enhancing creative writing is also significant. By offering original and imaginative prompts, the AI encourages students to expand their creative boundaries and explore new writing styles and genres. This can be useful not only for literature and arts courses but also in developing students' general creative thinking and problem-solving skills in a variety of subject areas. The goal is to foster a proactive and inventive mindset.

2.7 Peer Review Facilitator

The simulation of peer review processes through LLMs like ChatGPT represents a significant innovation in educational methodology. ChatGPT can act as a virtual peer reviewer, providing constructive feedback on student writings, which is so very useful for the iterative process of writing and learning. This AI-driven feedback mechanism might be able to replicate the critical and supportive insights typically offered by human reviewers. By analyzing text for coherence, argumentative strength, and clarity, ChatGPT helps students identify weaknesses in their drafts and offers suggestions for improvement. This simulated peer review process not only accelerates the revision cycle but also reduces the dependency on human resources, allowing more frequent and timely feedback that is crucial for the developmental writing stages.

ChatGPT's capability to provide feedback is grounded in its ability to process and apply complex rules of grammar, style, and logic consistently. Unlike human reviewers, who may have subjective biases or variability in their responses, ChatGPT seemingly maintains a neutral and consistent standard. This consistency ensures that all students receive equal quality of feedback, promoting fairness in educational practices.

Additionally, the immediate nature of AI feedback fosters a more dynamic learning environment where students can experiment with various rhetorical and analytical strategies and instantly gauge the efficacy of their attempts. This aspect of ChatGPT is particularly beneficial for stimulating a growth mindset among students, encouraging them to view writing as a process that involves continuous refinement and learning.

The integration of ChatGPT into the peer review process can also enhance student engagement and learning autonomy. By receiving immediate, actionable feedback, students are prompted to take active roles in revising and improving their work, which helps to cultivate skills in critical thinking and self-assessment. ChatGPT's application extends beyond just a writing aid; it becomes an integral part of a comprehensive educational strategy that aims to develop independent, reflective, and competent learners equipped to navigate the complexities of an increasingly information-driven world.

2.8 Accessibility Tool

ChatGPT's ability to assist students with disabilities or language barriers marks a significant advancement in making educational environments more inclusive and accessible. Through its natural language processing capabilities, ChatGPT can offer real-time language translation and simplification services, which are useful for students who might struggle with the medium of instruction due to linguistic differences. Non-native speakers are helped by the breaking down of language barriers that often hinder academic progress.

Furthermore, for students with reading disabilities such as dyslexia, ChatGPT can rephrase complex texts into simpler language, improving readability and understanding. (Botchu et al., 2024) This adaptive language support not only fosters a more inclusive classroom environment but also empowers students with diverse needs to participate fully in their educational pursuits.

Moreover, ChatGPT's interactive and responsive nature is particularly beneficial for students with cognitive disabilities. It can provide explanations at a tailored pace and repeat information without loss of patience, which is important for learners requiring additional processing time. The AI's capacity to engage in one-on-one interactions without the constraints of a typical classroom setting allows for personalized learning experiences that can be adjusted according to individual student needs. Additionally, the anonymity and non-judgmental interaction can reduce the stigma and pressure that these students might feel in traditional learning contexts, encouraging a more positive learning experience.

The integration of ChatGPT into educational practices for students with disabilities is aligned with broader legislative frameworks and educational policies advocating for accessibility and equal opportunities in learning. The potential of AI to contribute to more equitable educational outcomes might signal a paradigm shift towards embracing technology as a fundamental component of inclusive education strategies.

2.9 Cultural and Contextual Sensitivity Checker

As global classrooms become increasingly diverse, the need for sensitivity in language that respects all cultural, ethnic, and personal backgrounds becomes more important. ChatGPT can assist in this regard by analyzing text for potentially insensitive or inappropriate language that could alienate or offend individuals based on race, gender, ethnicity, or other personal characteristics. The AI's ability to identify and suggest alternatives to such language helps educate students about the nuances of culturally responsive communication. This preventive approach not only minimizes instances of inadvertent offense but might also promote an educational atmosphere conducive to mutual respect and understanding.

ChatGPT's role extends beyond mere identification to include educational interventions that can guide students in understanding why certain phrases may be considered inappropriate and what alternatives might be more suitable. This shifts the focus from punitive measures to a more constructive, learning-focused approach. Through continuous interaction with the AI, students can develop a more nuanced understanding of language and its impacts, hopefully inciting greater empathy and social awareness.

ChatGPT can serve as an up-to-date resource that reflects current societal values and norms, assisting institutions in maintaining relevance and rigour in their educational offerings. Ultimately, ChatGPT's potential to detect and correct culturally insensitive language not only enhances the quality of student communications but also contributes to the broader educational mission of cultivating inclusive communities.

2.10 Thesis Advisor

ChatGPT can assist graduate students in developing nuanced, relevant, and researchable questions that are so very important to the success of a thesis or dissertation. This capability stems from the AI's ability to analyze existing knowledge gaps within a vast array of literature, thereby suggesting questions that can significantly contribute to scholarly discussions. The precision with which ChatGPT can generate and refine research questions not only streamlines the initial stages of thesis preparation but also enhances the scholarly rigour of the research proposal. This support is particularly useful in disciplines in which determining a viable research question is challenging due to the complexity of the subject matter.

students navigating the expansive and often daunting terrain of academic research, having access to an AI tool that provides immediate, informed feedback can dramatically reduce the time and effort involved in preliminary research tasks. ChatGPT can suggest innovative angles and interdisciplinary approaches that might not be immediately apparent to novice researchers. Additionally, the AI's ability to adapt to the specific needs and academic level of the student enhances personalized learning.

3. Conclusion

The threats posed by ChatGPT to the current educational paradigm should not be minimized. But we are well advised to also consider the pedagogical opportunities represented by the technology, particularly in the area of writing. There is much still unknown about the extent to which LLMs like ChatGPT can truly enhance student ability and attitude, and to which it can contribute to the enhancement of the student learning experience. But the potential is certainly there. These capabilities underscore the transformative potential of AI in academic writing, suggesting that such tools are not only functional aids but also pedagogical allies in the cultivation of critical academic skills. Educators should consider integrating AI tools into higher education writing curricula, as their inclusion might ultimately lead to richer academic discourse and more proficient writers in the scholarly community.

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Development of a Career Guidance Module for Elementary School Students: A Pedagogical Approach to Early Career Education

Maryam Rahim¹, Wenny Hulukati², Idriani Idris³, Nicki Yutapratama⁴, Nurul Maulida Alwi⁵

^{1,2,3,4,5} Department of Guidance and Counseling, Universitas Negeri Gorontalo, Indonesia

Correspondence: Wenny Hulukati. Email: wennyhulukati@ung.ac.id

Abstract

This study aims to develop a career development module for elementary school students. The research method employed Research and Development (R&D), which involved the following steps: (1) identifying potential and problems, (2) data collection, (3) product design, (4) design validation, (5) design revision, (6) product testing, and (7) product revision. Data were collected through questionnaires, including expert validation questionnaires and small group testing questionnaires. The data sources comprised three experts: a Career Guidance and Counseling expert, a Media Guidance and Counseling expert, an Indonesian language expert, and three elementary school teachers for the small group testing phase. Data analysis was conducted using qualitative methods to evaluate the results from expert validations and small-group testing. The research and development process produced an Elementary School Career Development Module deemed suitable for use in fostering career development among elementary school students. The module's feasibility was established through validations by career guidance and counseling experts, media design experts, Indonesian language experts, and small group testing conducted by guidance and counseling teachers and subject teachers at the elementary level. Therefore, the elementary school career development module is recommended to facilitate career development among elementary school students.

Keywords: Module, Career Development, Students, Elementary School

1. Introduction

Elementary school-aged students are individuals undergoing a developmental process toward subsequent growth phases. Therefore, this age is considered a foundational stage for individual development. Elementary school students are individuals with various potentials ready to be nurtured through stimulation in a conducive environment. The development of the potential of elementary school-aged children is also regarded as a basis for achieving accomplishments in various fields in the future.

Career potential is one of the capabilities demonstrated by elementary school students and requires development efforts by teachers, particularly through career guidance services provided by guidance and counseling teachers (Rahim, Hulukati, & Madina, 2021). Assisting students in understanding their talents, interests, aspirations, intellectual abilities, attitudes, and emotions, as well as helping them comprehend the workforce, such as types of jobs, job requirements, further education, and study programs, which are among the activities included in career guidance. Teachers with specialized competencies as guidance and counseling professionals must carry out these activities. In Indonesia, introducing ideas related to career interests and knowledge to children is undoubtedly a challenging task. One of the primary obstacles is the lack of human resources and knowledge, as the number of counselors in elementary schools remains insufficient (Ayriza et al., 2020). Unlike private schools, public elementary schools, including those in Gorontalo, lack dedicated guidance counselors. Consequently, counseling services are integrated into learning activities led by subject or homeroom teachers.

According to Yavuz (2022) and Oliveira et al. (2016), elementary school is an ideal time to initiate career development and early exploration. As highlighted in the case study by Mariani et al. (2016), forming a team to enhance a career-related curriculum can effectively implement early career readiness interventions for the transition to middle school. Thus far, activities conducted by elementary school teachers to support students' career development include writing exercises, such as writing about their aspirations and plans for further education. These activities often appear to be conducted without significant follow-up efforts. This is assumed to be due to teachers lacking the skills to use writing as a method for career development among elementary school students. Based on this perspective, developing a module that can assist elementary school teachers in utilizing writing methods for career development is necessary. This consideration is also supported by the condition of elementary schools in Gorontalo City, which currently lack such a module.

The use of writing methods in developing student behavior has been demonstrated in a study by Thalib, Rahim, and Usman (2020), which found that writing techniques can enhance the naturalistic intelligence of elementary school students. Similarly, research by Hibatulloh, Nurihsan, and Rusmana (2023) showed that expressive writing can improve students' happiness. The problem addressed in this study is the absence of a guide for utilizing writing methods that teachers can use to foster career development among elementary school students. This research aims to develop a module for employing writing methods to enhance career development in elementary school students.

2. Theoretical Review

2.1. Career Guidance and Counseling in Elementary Schools and Career Development Stages of Elementary School Students

The responsibility of education is not limited to helping students achieve behavioral changes in the cognitive, affective, and psychomotor domains; education is also responsible for assisting students in developing their career potential as a foundation for planning and selecting careers appropriately. This support can be provided through subject-based learning or career guidance and counseling services. Career guidance and counseling is an activity aimed at helping students develop various career potentials, enabling them to choose a career that aligns with their personal circumstances and benefits society.

According to Dabula and Makura (2013, 91), career guidance programs should aim at developing important skills for life and work and assisting with immediate decisions. Gibson and Mitchell (2011, 446) define career counseling as an activity carried out by counselors in various settings to stimulate and facilitate career development throughout a person's working life. This activity includes assistance in career planning, decision-making, and self-adjustment. Natawidjaja (Gani, 2012:11) states that career counseling is a process of support provided to students to help them understand themselves, gain an understanding of the world of work outside of themselves, and align their self-image with the world of work, ultimately enabling them to: (a) choose a career field, (b) prepare themselves for that field, (c) enter the field, and (d) nurture their career in a particular field. Nurihsan (2009:16) explains that career counseling is "an effort to assist individuals in recognizing and understanding themselves, understanding the world of work, and developing a future that aligns with the expected way of life." It can be concluded that

career guidance and counseling is an efforts to help students prepare for entering the workforce (career), plan and make career decisions, and overcome various challenges encountered in the work environment.

In general, career guidance and counseling are provided to help students gain career insights, demonstrated by their ability to understand themselves, the world of work, make career plans, choose a career, make career decisions, and resolve various career-related issues. Specifically, the objectives of career guidance and counseling are to assist students in: (a) obtaining information about specific careers, positions, or professions, (b) acquiring an accurate understanding of a specific job or profession, (c) being able to plan and make career choices, (d) adjusting to the chosen career, and (e) developing their career after completing their education (adapted from Tohirin, 2008:134).

Career guidance and counseling in elementary schools are integrated with the learning activities that are the responsibility of subject teachers or class teachers (Minister of Education and Culture Regulation No. 111 of 2014). Based on this policy, career guidance and counseling, as one of the fields within guidance and counseling, is also carried out in an integrated manner with the learning activities of subject teachers or class teachers.

Career development progresses in tandem with overall individual development. Donald Super (Gladding, 2004; Zunker, 1986; Kidd, 2006; Gibson and Mitchell, 2011) outlines the stages of career development as follows: (a) Ages 0–14: the growth stage, characterized by the development of capacities, attitudes, interests, and needs related to self-concept, and (b) Ages 15–24: The exploratory stage (ages 15–24) is marked by a tentative phase where options are narrowed down but not yet finalized. (c) Ages 25–44: the establishment stage, characterized by trials and stabilization within a chosen career field. (d) Ages 45–64: the maintenance stage involves continuous adjustments to improve one's position and work situation. (e) Age 65 and beyond: the decline stage, marked by pre-retirement considerations, reduced work output, and eventually leading to retirement.

Considering career development, according to Donald Super, it can be understood that elementary school students are in the growth stage, characterized by developing capacities, attitudes, interests, and self-concept-related needs. The elementary school years also mark a development period in various interests, skills, abilities, and values (Knight, 2014). According to Clark (1991) and Chancy (2022), career development should be designed from the elementary school level so that students understand their career direction after completing secondary school and benefit them throughout their lives.

2.2. Writing as a Career Guidance and Counseling Technique

Writing is a skill that every student should possess from elementary school age. Therefore, every elementary school student has acquired writing skills, especially in the upper grades. Writing can be used as one of the methods for providing guidance and counseling services (Rahim et al., 2021). According to Rahim et al. (2021), writing is a service method implemented by asking students (counselees) to compose or write (poems, short stories, complete sentences) about something related to the goals and content of the service. This writing activity is expected to show that students (counselees) will exhibit behaviors aligned with the predetermined goals of the service.

Rahim et al. (2021) define writing as an activity of expressing ideas, thoughts, opinions, and feelings through written language. The writing activity allows the writer to visualize things that are thought, desired, or felt in written form, making them accessible to others. Writing can also be used to express an experience about someone or a situation as if the writer were the one experiencing it. Silberman (2006, p. 198) argues that writing activities allow students to reflect on their own experiences. Writing is a dramatic way to enhance and express independent reflection in written form.

As a career guidance counseling service method, the writing technique is used with the following procedure: (a) Ask the students to choose a topic they will write about, for example, my dream, when I become a police officer, I want to be a teacher, becoming a parking attendant, activities in a factory/office and other workplaces, my mother is a nurse, and other topics that align with the service topic. (b) Explain to the students the objective of writing on the chosen topic, (c) Ask the students to write (in the form of poetry, short stories, or completing sentences) about

the topic they have selected. Ensure that each student writes all their thoughts in simple sentences according to their individual abilities. (d) Provide enough time for the students to write. Once finished, ask each student to read their writing aloud in front of the teacher and classmates, (e) Discuss the writing content to draw conclusions, (f) Ask each student to make a commitment regarding their thoughts or feelings related to the writing they have created. Through clear procedures, the writing activity is expected to shape specific behaviors in students, including behaviors related to careers, such as career understanding, career development, or career planning.

3. Research Method

This study employed a research and development (R&D) approach to create and validate a career development module for elementary school students, with a particular focus on writing as a method for career exploration. The research followed a structured seven-step model to ensure a systematic and iterative development process.

3.1. Identifying Potential and Problems

The initial step involved recognizing the need for career development materials for elementary school students. A preliminary literature review and field observations were conducted to analyze existing gaps in career education at the elementary level. The study identified that career guidance in elementary schools is often limited to basic introductions to professions, lacking structured activities that engage students in self-exploration.

3.2. Data Collection

Data collection was conducted through interviews and questionnaires with stakeholders, including elementary school teachers and experts in career guidance, counseling media, and Indonesian language education. These data sources provided insights into the existing challenges in career education and the feasibility of introducing a structured module to enhance students' career awareness through writing activities.

3.3. Product Design

The development of the module was based on the findings from the previous steps. The module was designed to introduce students to various professions through structured writing exercises, allowing them to express their career interests, self-concept, and aspirations. The content was structured to include learning objectives, professional field clusters, guided writing exercises, interactive activities, and career-related reflections to facilitate self-exploration.

3.4. Design Validation

The initial draft of the module underwent an expert validation process to ensure its effectiveness, accuracy, and appropriateness for elementary school students. Three experts were involved in this validation process:

- An expert in **Career Guidance and Counseling**, who assessed the module's alignment with career development theories and its applicability in elementary education.
- An expert in **Counseling Media**, who evaluated the module's instructional design, usability, and effectiveness as a learning tool.
- An expert in **Indonesian Language**, who reviewed the language clarity, readability, and appropriateness for elementary school students.

The expert evaluation used the following scale

0	1	2	3	4	5	6	7	8	9	10
(Very Poor)						(Very Good)				

Revisions were required for aspects that received an average score of 7.0 or below to enhance the quality of the module before proceeding to the next stage.

3.5. Design Revision

Based on feedback from the expert validation process, modifications were made to improve the content, structure, and instructional strategies within the module. Revisions included clarifying instructions, refining writing prompts, restructuring sections for better coherence, and incorporating additional career exploration activities to enhance engagement.

3.6. Product Testing (Small Group Trial)

The revised module was tested with a small group of three elementary school teachers who implemented it in their classrooms. The teachers provided feedback on the module's usability, effectiveness, and practicality in guiding students through career-related writing activities. Student engagement and comprehension levels were also observed during the trial phase.

3.7. Product Revision

After the small group trial, final modifications were made based on the teachers' feedback. This process aimed to refine the module further and address any issues that arose during implementation. The revisions focused on enhancing user-friendliness, improving activity flow, and ensuring that students could independently navigate the module with minimal teacher assistance.

3.8. Data Analysis

The data obtained from expert validation and the small group trial were analyzed using qualitative methods. The qualitative analysis involved:

- Thematic analysis of expert feedback to identify strengths and areas for improvement in the module.
- Descriptive analysis of responses from the small group trial to evaluate the module's practicality and effectiveness in a classroom setting.

The final career development module was refined based on these analyses, ensuring that it serves as a structured, engaging, and effective tool for career exploration among elementary school students.

4. Results

Based on the research and development process, the results or product obtained are a career development module for elementary school students. This module explains the use of writing methods in developing the career paths of elementary school students. The following steps were undertaken to achieve this result:

4.1. Steps I and II: Potentials and Problems and Data Collection

The research activities at this stage focused on identifying the potential and problems related to career development for elementary school students. Based on interviews with elementary school teachers, it was found that there was no existing career development module for elementary students, specifically regarding the use of writing methods to support career development. This data served as the basis for developing the career development module for elementary school students.

4.2. Step III: Develop the Initial Product Design

At this stage, planning the initial product design, the career development module for elementary students, began. The activities started with preparing various literature and data required for developing the initial product design.

4.3. Step IV: Design Validation

Activities at this stage included: (1) developing the design validation instruments. These instruments consisted of a career counseling expert validation instrument, a media design expert validation instrument, and an Indonesian language expert validation instrument; (2) peer validation, which involved validation by fellow researchers of the instruments developed; (3) validation of the initial product design by career counseling experts, media design experts, and Indonesian language experts. The validation results were used to revise the product.

The expert validation data is explained as follows:

Table 1: Career Counseling Expert Validation Data

Indicator	Score	Assessment Category	Revision/No Revision
Clarity of objective formulation	9	Very Good	No
Relevance of material description to the objective	10	Very Good	No
Adequacy of material	9	Very Good	No
Appropriateness of exercises	9	Very Good	No
Suitability with the career development of elementary students	9	Very Good	No
Completeness of module content	9	Very Good	No
Benefits for elementary students	10	Very Good	No
Benefits for elementary school teachers	9	Very Good	No
Average Score	9.25	Very Good	No

Table 1 shows that the average score for the career counseling expert validation is 9.25, categorized as "Very Good." The results of this assessment conclude that no revisions are necessary for the components of the module.

Table 2: Media Design Expert Validation Data

Indicator	Score	Assessment	Revision/No Revision
Relevance of cover image to module content	9	Very Good	No
Layout of the cover image	9	Very Good	No
Layout of text on the cover page	9	Very Good	No
Font size on the cover page	9	Very Good	No
Font size in the module content	10	Very Good	No
Appearance of the cover page	8	Very Good	No
Appearance of the module content pages	8	Very Good	No
Overall appearance of the module	9	Very Good	No
Average Score	8,88	Very Good	No

Table 2 shows that the average score for the media design expert validation is 8.88, categorized as "Very Good." The results of this assessment conclude that no revisions are necessary for the components of the module.

Table 3: Indonesian Language Expert Validation Data

Indicator	Score	Assessment	Revision/No revision
Use of diction	8.5	Excellent	No revision
Sentence coherence	9	Excellent	No revision
Paragraph coherence	9	Excellent	No revision
Clarity of sentences used	9	Excellent	No revision

Clarity of the main ideas in paragraphs	9	Excellent	No revision
Use of capital letters	9	Excellent	No revision
Use of punctuation marks	8,5	Excellent	No revision
Conformity with Indonesian writing standards	9	Excellent	No revision
Ease of understanding by the reader/user	9	Excellent	No revision
Average Score	8.89	Excellent	No revision

Table 3 shows that the average Indonesian language expert validation score is 8.89, categorized as "Excellent." The results of this assessment conclude that no revisions are necessary for the components of the module.

4.4. Step V: Product Revision

Based on the validation data obtained from experts, revisions to the initial product were carried out during this stage. However, the expert validation results indicated that no revisions were necessary for the career development module for elementary school students developed in this research.

4.5. Step VI. Product Testing

Several activities were conducted at this stage, including: (1) Preparing the product testing instruments, (2) Validating the small group testing instruments through peer validation, and, (3) Conducting small group testing. The small group testing was performed by three elementary school teachers who assessed various aspects of the module content, including: (1) Introduction, (2) Objectives, (3) Material explanations, (4) Exercises, and (5) Summaries. The teachers used the following assessment categories:

- a. Comprehension: MD (Easily Understood), CMD (Moderately Understood), SD (Difficult to Understand)
- b. Implementation: MD (Easily Implemented), CMD (Moderately Implemented), SD (Difficult to Implement)

The results of the small group testing are shown in Table 4 below:

Table 4: Results of Small Group Testing

Assessed Aspect	Comprehension			Implementation			
	R1	R2	R3	R3	R1	R2	R3
Introduction	MD	MD	MD				
Objectives	MD	MD	MD				
Material Explanations	MD	MD	MD				
Tasks/Exercises	MD	MD	MD	MD	MD	MD	MD
Summary	MD	MD	MD				

4.6. Step VII: Product Revision

Table 4 presents the small group testing results conducted with three elementary school teachers. The data indicate that the career development module received evaluations from all three respondents in the categories of "easily understood" (MD) and "easily implemented" (MD). Based on these findings, it can be concluded that the career development module for elementary school students developed in this study is suitable for use as a medium to support students' career development.

The module contains several components, including (1) Content, which consists of: (a) Introduction, (b) Activity objectives, (c) Material, (d) Activities, (e) Tasks/Exercises, (f) Summary, and (g) References. The material covers: (a) Understanding talents and interests, (b) Understanding aspirations, (c) Developing self-concept, (d) Understanding the working world, and (e) Understanding future planning. (2) Methods, including: (a) Writing

paragraphs, (b) Completing sentences, (c) Writing poems, and (d) Writing short stories. (3) Tasks/Exercises, aligned with the objectives. (4) Summaries, in accordance with the objectives.

5. Discussion

The career development module designed in this study serves as an independent learning resource that can be effectively integrated into teaching and guidance and counseling services for elementary school students. Career education at an early stage plays a crucial role in shaping students' self-awareness, aspirations, and professional orientation. However, career development initiatives at the elementary level remain underdeveloped in many educational settings. This study responds to that gap by introducing a structured career development module using writing as an interactive and reflective method to help students explore and articulate their career aspirations.

Modules as educational tools offer clear guidelines, objectives, and structured content, making them accessible for independent use by both teachers and students. In career guidance, they provide essential information on various professions, aligning career awareness with students' self-concept and future aspirations. The module developed in this study incorporates expert validations from guidance and counseling professionals, Indonesian language experts, and education practitioners, ensuring its appropriateness and effectiveness in facilitating career exploration among young learners. Through small group trials, it was evident that students showed increased engagement and a deeper understanding of career-related concepts when guided through structured writing activities.

5.1. Enhancing Career Awareness through Writing Activities

The integration of writing in career development modules offers a unique approach to fostering self-reflection and career exploration. Writing activities encourage students to express their aspirations, recognize their talents and interests, and connect them to potential career paths. Unlike traditional career guidance methods, which often involve passive exposure to career options, the writing-based approach allows students to actively construct their understanding of the professional world. By articulating their thoughts and experiences through writing, students develop self-awareness and begin to align their skills and interests with future career possibilities.

Moreover, writing as a medium enables teachers and counselors to gain valuable insights into students' career inclinations. The written responses provide a deeper understanding of each student's perspective, helping educators offer more targeted guidance. Writing exercises also foster creativity, critical thinking, and communication skills—competencies that are crucial in preparing students for future academic and professional endeavors.

5.2. Bridging the Gap in Career Education for Elementary School Students

Despite the importance of career development in early education, elementary school teachers often have limited resources and structured materials to introduce students to diverse professions. Career introduction activities in many schools are generally confined to superficial representations, such as role-playing in professional uniforms, without deeper engagement in the skills, knowledge, and educational pathways required for each profession. Additionally, entrepreneurship activities conducted in schools tend to focus solely on business skills, overlooking the broader spectrum of career possibilities.

This study's findings align with previous research emphasizing the necessity of structured career interventions at the elementary level. Welde et al. (2016) found that project-based or profession-focused career education significantly benefits students by fostering career awareness. Similarly, Calvaro et al. (2019) highlighted the need for short-term, school-based career development programs to familiarize young learners with career options early on. These studies support the importance of introducing career modules as an integral part of elementary education.

5.3. Adapting Career Education to Global Workforce Trends

The rapid advancement of technology has led to the emergence of new professions that were previously non-existent. This shift necessitates a modernized approach to career guidance, ensuring that students are introduced not only to traditional professions but also to careers shaped by technological and scientific developments. Elementary school students today will enter a workforce vastly different from the current job market, making it imperative to equip them with relevant career knowledge from an early age.

Several studies (Eliza et al., 2023; Karamoy et al., 2023; Leksana et al., 2013; Nurfauziah et al., 2023; Rajasa & Khusumadewi, 2022) have emphasized the effectiveness of career development modules in enhancing students' career awareness. However, the application of such modules remains limited, particularly at the elementary level. This research highlights the need to develop and implement structured career guidance programs that not only introduce conventional professions but also integrate information about emerging careers influenced by digitalization, artificial intelligence, and other technological advancements.

5.4. Career Guidance as a Preventive and Developmental Approach

Career guidance and counseling in elementary schools serve not only as a developmental tool but also as a preventive measure to help students plan their future careers. According to Korompot et al. (2022), early career interventions can prevent career indecisiveness in later stages of education. Donald Super's career development theory states that elementary school students are in the growth stage, where they begin forming self-concepts related to their careers. This aligns with research findings indicating that young students can recognize their personal characteristics and relate them to potential career options.

Career development modules, such as the one introduced in this study, act as a vital medium for delivering career guidance at this early stage. Studies by Rahim et al. (2023) show that using career pocketbooks as career guidance tools enhances elementary students' career understanding. Similarly, Andriani (2019) found that guidance boards significantly improve students' comprehension of career information. These findings indicate that various educational media, including career development modules, can effectively support career education at the elementary level.

5.5. Implications for Policy and Educational Practice

The findings of this study suggest that career guidance should be systematically integrated into elementary school curricula. Schools, educational policymakers, and curriculum developers should prioritize career education as an essential component of early childhood development. The adoption of career development modules can bridge the gap between theoretical knowledge and real-world career exposure, preparing students for future educational and professional challenges.

Furthermore, teacher training programs should emphasize career guidance strategies to ensure that educators are well-equipped to facilitate career education. Providing teachers with structured materials, such as career development modules, will enable them to guide students effectively in exploring various career options. Additionally, collaboration between schools, parents, and industry professionals can further enrich students' career learning experiences.

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Transition from Regular English Instruction to Bilingual Education: An Experience Using Gamification

Jean Pierre Piloso-Cedeño¹, Jhonny Villafuerte-Holguin²

¹ Universidad Laica Eloy Alfaro de Manabí, Ecuador

Programa de Pedagogía de los idiomas Nacionales y Extranjeros

Research project: Innovaciones pedagógicas e internacionalización de la formación de docentes para el desarrollo humano y sostenible. Email: e1316554607@live.uileam.edu.ec / ORCID: <https://orcid.org/0009-0005-6239-242X>

² Universidad Laica Eloy Alfaro de Manabí, Ecuador

Research project: Innovaciones pedagógicas e internacionalización de la formación de docentes para el desarrollo humano y sostenible. Grupo de investigación Innovaciones Pedagógicas para el Desarrollo Sostenible de ULEAM, Ecuador, Red LEA, Ecuador. Email: Jhonny.villafuerte@uleam.edu.ec / ORCID: <https://orcid.org/0000-0001-6053-6307>

Abstract

Gamification delivers evidence of being an innovative approach that fosters student engagement and enhances proficiency in language education. This study aims to examine the effects of gamification on the transition from traditional English language instruction to bilingual education in Manta-Ecuador. It uses an interpretative paradigm and a mixed-method research approach. The participants were 81 students attending a private high school located in Manta-Ecuador. Data collection instruments included flash surveys, focus groups, observation forms, and pre-test/post-test assessments of overall English proficiency. The researcher designed an educational intervention incorporating common gamification elements to reduce non-flow emotions and improve English proficiency. The findings indicate that classrooms using gamification experienced notable improvements. However, the results also revealed that students learn more effectively and experience less stress when activities are not graded. These results highlight the potential of gamification as an effective teaching strategy but also as a means to reduce student stress in high-pressure high school environments. Future research should explore the long-term effects of gamification and its impact on different levels of English proficiency.

Keywords: Gamification, Learning English, Bilingual Education, Motivation, Teenagers

1. Introduction

Becoming bilingual is a goal for so many people to have the SKILLS to speak two different languages, a condition that makes you stand out in front of others. It does not only help our resume but, according to Hajimohammadi and Heidari (2025,) being bilingual fosters overall cognitive mechanisms. Moreover, Yang et al. (2025) state that individuals with an L2 domain are better at creative performance than non-bilingual speakers. As a result, many private schools are increasingly shifting from traditional instruction to bilingual education to make their

educational plan reluctant from its competition. It makes local education evolve into one globalized with the use of English to offer public recognition. However, it is not yet an aspiration that not everyone can access (Bai & Zang, 2025). While some schools make a smooth transition, others face challenges, as becoming bilingual is a gradual process that takes time.

In many countries, English is a key factor that improves a person's resume. In Ecuador, English is considered an asset in various educational fields (Alvarez et al., 2024). Nonetheless, among the countries in Latin America, Ecuador has one of the lowest English levels and worldwide reaches place #82 (EF Proficiency Index, 2024). It may center on demotivation, insufficient classroom hours, fear of learning a new language, and students carrying issues from the previous academic year. However, according to Sevy-Biloon et al. (2020), there are five factors affecting the learning of English in Ecuador such as pedagogical factors, use of Spanish in the classroom, perception of the status of CLT (Communicative Language Teaching), infrastructure, and educational policies. In addition, there is also the problem with the teachers, as some do not meet the required qualifications to teach English in the public school system, according to Acosta et al. (2023). There is insufficient funding to hire qualified English teachers, and schools' last resort is to choose non-English teachers to teach basic English (Orosz et al., 2021). This problem is more prevalent in public schools, while private schools often strive to become bilingual institutions to attract students. As a result, there are two contrasting realities within the same country. Despite the efforts of private institutions, the overall English proficiency level in Ecuador remains low.

A different issue to consider in Ecuador is the teaching methodology. According to Song et al. (2025), traditional instruction prepares students to learn by memorization, which fails to foster higher-order thinking skills. Moreover, such pedagogical methodologies are typically teacher-centered, meaning that students are passive listeners rather than active participants in the classroom (Alelyani & Alharbi, 2025). The challenges are the impact of online classes during the pandemic, which have contributed to students' struggles with sitting still and listening to a teacher (Argudo-Serrano et al., 2023). These conventional methods are often perceived as boring and irrelevant, leading students to prefer technology and innovative methodologies (Srivani et al., 2022). It is in the teachers' cleverness to adapt their lessons using strategies that promote creativity and fun by focusing on including game elements in the lesson planning (Yuan et al., 2024).

To provide more context for the main topic of this investigation, the transition discussed here occurred from one school year to the next. The world has not fully recovered from the pandemic of COVID-19 effects, and during that time, teachers had to rapidly plan strategies and lessons to deal with and teach using online resources due to the lockdown. This transition was incredibly stressful for everyone, especially for teachers. These heightened stress levels impacted the quality of lessons and, consequently, affected students' performance, with the effects still evident in the years following the pandemic (Medina et al., 2024). In schools, deficits can be observed in some students, having difficulties concentrating for extended periods during class. As a result, these students are now navigating a world of constant change, which can overwhelm their ability to adapt. This study explores the experience and results of gamification during a transitional period from traditional instruction to bilingual education in EFL.

This article proposes a gamification methodology to support the transition into bilingual instruction by creating an environment of fun where students avoid burnout (DiCesare et al., 2025). It allows students to relate the vocabulary they learn to their native language easily (Burgos et al., 2024).

In addition, it is essential to clarify concepts to distinguish between game-based learning involving the use of digital tools for teaching (Vodenicharova, 2022) and gamification, which incorporates game strategies commonly found in videogames to engage and motivate learners through systems of progression and competition. Gamification does not always require digital resources (Charkova, 2024). Thus, there are differences between these two methodologies that people usually forget and think of as one. Sipone et al. (2025) also support this idea by stating that gamification does not necessarily require technology or games to develop a lesson. In contrast, game-based aims to teach content by fully integrating gameplay into the learning process.

As technology evolved, people began integrating activities from their daily lives with technological tools to enhance their experiences. One of which is entertainment. When traditional games and technologies combined, a new realm of possibilities emerged. This innovation sparked interest in game-based learning, which combines digital technologies with education (Liu et al., 2025). As the educational field continuously seeks innovation, educators began exploring strategies from video games to enhance teaching. Nowadays, gamification has gained attention due to its potential to engage students and, more importantly, improve language proficiency (Song et al., 2025).

Thus, Zolfaghari et al. (2025) analyzed 33 articles on gamification in teaching English as a foreign language to ratify the benefits of such teaching methodology: (1) It can increase motivation for learning, engagement, and active participation, (2) The benefits arise from elements and activities teachers can incorporate into their lessons through gamification, (3) Games involve people for enjoyment or learning; they could be practiced alone or in groups, (4) Rewards are elements that make games enjoyable, based on the behaviorism theory.

Gamification applies diverse strategies to teach attractively. However, learners require rewards to take part in a lesson (Chen, 2025). It can be an extrinsic motivation. Consequently, students will not participate in lessons when they do not receive a reward (Cruz et al., 2018). According to Bardach and Murayama (2024), extrinsic motivation can foster intrinsic motivation.

The behaviorism theory developed by Csikszentmihalyi (1990) mentions that when people fully concentrate on an activity of their interest, they enter a state of “flow,” where they keep immersed in the activity and feel in control of their actions. An aspect of this theory is that when individuals engage in tasks that match their skill level, they enjoy the experience and avoid negative emotions such as frustration (Arai, 2025). In addition, the flow theory is closely related to gamification, as one of its goals is to minimize negative emotions in students, such as anxiety or shame. Gamification can guide students into a flow state to feel good about achieving their objectives through appropriately challenging tasks (Rababah et al., 2025).

In this article, the research team developed an educational intervention using multiple digital resources to engage students, such as Canvas, YouTube, Wordwall, Genially, and LyricsTraining. As suggested by Cordoba et al. (2024), the application of game-based learning relates to students' access to digital resources. The success of gamification is dependent on the teachers' creativity and adaptability (Tayeh et al., 2024). Videogame strategies encourage gamers to keep playing and use for learning a foreign language; it is necessary to ensure that rewards and challenges are clearly defined to foster a sense of progression among students (Jaramillo-Mediavilla et al., 2024).

According to Kamrach y Sriwichai (2024), speaking skills and confidence should be fostered for speaking fluency. Participants studied Science, Technology, Arts, Math, and Social Studies. Such an educational approach is beyond the language barrier academically recognized as STEAM (De la Cal et al., 2023). Each subject presented content-related challenges, and the abrupt transition to this approach made learners feel incapable of learning (McEwin et al., 2025). The research team, non-native English language users, can attest to the challenges of learning English. In the early stages, it is crucial to master the concepts of vocabulary, sounds, and pronunciation. Effective acquisition of new words is essential to avoid difficulties in later stages, where communication may be misunderstood (Morsi & Sivakami, 2024).

Previous studies emphasize the increasing relevance of the English domain for personal success. Thus, Bai and Zang (2025) highlight that young people see proficiency in English as a mechanism to accomplish their goals in a globalized world when bilingualism is beneficial for their future careers. Furthermore, Srivani et al. (2022) and Yuan et al. (2024) discovered that modern students find traditional teaching methods ineffective, preferring interactive tools like games and videos. In addition, McEwin et al. (2025) inform that for the participants to study STEAM subjects is a complex challenge, marking as necessary that students understand the content entirely. Finally, studies by Zolfaghari et al. (2025) and Song et al. (2025) support the beneficial effects of gamification on student motivation and language development.

The questions of research to answer are:

- 1: What are the motivations for learning English as a foreign language?
- 2: What are the preferences regarding linguistic practice to learn English?
- 3: What are the perceptions concerning the challenge of bilingual education?
- 4: How engaged are participants in practicing EFL through gamification?
- 5: What changes reached the participants' English language knowledge at the end of the intervention?

This study aims to examine the effects of gamification on the transition from traditional English language instruction to bilingual education in Manta - Ecuador.

2. Methodology

This study subscribes to the interpretative paradigm, with a mixed-method approach. The participants are 81 students, 39 male and 42 female. The participants' ages are between sixteen and seventeen years old; they attended regularly to a private school located in Manta-Ecuador which transitioned from a conventional educational system in Spanish language toward a bilingual instructional system. The research follows the ethical codes of University Laica Eloy Alfaro de Manabí in Ecuador and the American Psychology Association (APA). It means that the data collected is under the care of the research team leader for at least 7 years. Data can be used only for academic purposes never for commercial purposes.

2.1. Instruments

The instruments used in this research are:

Flash Survey. - The instrument ad hoc has as purpose of collecting evidence of students' motivations for learning EFL. It collects participants' opinions, ideas, thoughts, and perceptions concerning their motivations for learning English as a foreign language. A panel of three experts in educational research ascribed to the ULEAM university from Ecuador evaluated the instrument. They recommended using the following categories to analyze the information collected: (1) cultural access, (2) professional opportunities, (3) social communication, (4) educational advantages, (5) traveling benefits, and (6) learning experience perspective. Participants responded to the flash survey after every EFL lesson in printed formats which takes about 2-4 minutes on average.

Focus Group guide. – The instrument ad hoc, collects information about the participants' fear before facing a new methodology and lessons having a language complexion higher level. The instrument was evaluated by a panel of three experts in educational research ascribed to the ULEAM university from Ecuador. They recommended to reduce the number of questions from 14 in the original version to 6 in the final version used in the study. The categories used in the focus groups are related to the teaching methodologies (a) gamification, (b) digital teaching tools, and (b) active lessons. A total of 3 focus groups allowed to collect 95 minutes of participants' voices. The focus groups took place at the installations of the school.

Class Observation Form. – The instrument used the Lesson Study Methodology. It evaluates students' engagement in English as a Foreign Language lesson. The items were planned to determine evidence concerning to the categories (1) participants' engagement when practicing English language, (2) use of digital didactic games, and (3) use of no-digital didactic games. Due to some limitations of the research team, school instructors recorded the sessions, therefore analyzed by the research team. They are a total of 12 class observations.

English Language Knowledge pretest and posttest. – The instrument uses the rubrics of the First English Test (FET) of Cambridge Press. It assesses participants' changes in their English knowledge with a higher focus on grammar and vocabulary. The pretest administrated at the beginning of the research (two weeks after students started the scholar year). The pretest assesses all the communication skills and content that participants studied the previous school year. The post-test shows participants' communication skills changes after the educational intervention; it consists of all the grades students acquired for around 3 months that intervention lasted. The pretest and posttest were executed at the installations of the school under the supervision of school official instructors.

2.2. Process

Stage 1. Selection of participants and design of research instruments. – The participants are students of a private high school located in Manta Ecuador. The participants' parents and tutors were informed about the project aims and they signed a consent inform letter.

Stage 2. Flash Surveys administration. – Researcher team runs flash surveys after every lesson in printed versions. They were 6 flash surveys to collect information about students' motivations for learning English language and the relations between their motivations and subjects they study.

Stage 3. English language knowledge pretest administration. – It was administered at the beginning of the research evaluated participants' knowledge about previous studies content. It consisted of questions for writing, speaking, listening, and reading skills. The time required for the evaluation of each skill is: 60 minutes.

Stage 4. Focus group administration. - It collected participants' opinions to improve the teaching transition from regular toward bilingual instruction. It allows the collection the information about activities to learn and practice English language. The time required per focus group session is 25 min, a total of 92 minutes.

Stage 5. Educational Intervention design. – The researcher designed an educational intervention with the application of digital and non-digital tools. The research team chose gamification as main teaching methodology to foster participants' English knowledge. The list of activities includes video-games and games for introducing vocabulary. It also followed the National high school curriculum. The subjects considered are Reading and Language Arts, Arts and Music, Social Studies, Natural Science and Math. The time required per session is 1 hour 20 minutes. The total intervention time is 10 weeks.

Stage 6. Observation Form. – It consisted of a form to evaluate the participants' motivation for learning EFL, participants' interaction, and conversations among peers concerning to the lessons. The lessons were recorded and their analysis executed at the end of the school week.

Stage 7. Posttest of participants' English knowledge. – It executed at the participants' school installations. They used a printed format. The instrument gathers all the scores from the time the researcher started the intervention to the end.

Stage 8. Data analysis. – The researcher decided to execute data descriptive statistical analysis using Excel. The use of percentages allowed to group all the data in a way that facilitates the analysis. It also used graphics to show the demonstrate the differences between the results.

3. Results

The results presentation follows the order of the research questions that appear in the introduction section of this paper.

3.1. Participants' motivations for learning English as a foreign language

In answer to the research question 1: What are participants' motivations for learning English as a foreign language? The answers obtained using the flash survey were analyzed by choosing the most repeated answers due to their frequency and similarities for finally being shown in percentages.

Table 1: Motivations on learning the English Language

Subcategories	TD	VD	D	A/D	A	VA	TA
(1) Cultural Access	0%	0%	0%	60%	0%	0%	40%
(2) Professional Opportunities	0%	0%	0%	0%	0%	0%	100%
(3) Social communication	0%	0%	15%	30%	15%	0%	40%

(4) Educational Advantages	0%	0%	0%	0%	0%	0%	100%
(5) Traveling Benefits	0%	0%	10%	50%	10%	0%	30%
(6) Learning Experience Perspective	0%	0%	0%	20%	0%	0%	80%

For the subcategory (1) Cultural Access, most of the students gave similar answers to the indicated, this means in percentages the 40% for watching movies and series in their original language, this highlights the interest that people have in the language because they want to understand what they are into.

In the subcategory (2) Professional Opportunities, it was the same procedure and the most repeated answer by 100% was that students want to learn English because they know that it is possible to get better opportunities due to the language.

For the subcategory (3) Social Communication, the repeated answer gave a percentage of 40% and it was said that due to English being the most spoken language in the world. A statement which is true nowadays since thanks to the power of the countries where English is spoken everyone wants to learn it.

The subcategory (4) Educational Advantage, the total was 100%, it was something that amazed me due to many students considered English important because at the moment to look up for information on internet they found it in English thus being able to translate it is a big achievement.

For the subcategory (5) Traveling Benefits. - It is the subcategory with less participant frequency. The most of the participants are not sure about this reason for learning EFL. The 30% of the participants were related to travel specifically about going to other countries and being able to speak with foreign people.

For the category (6) Learning Experience Perspective, the percentage is 80% being one of the highest numbers, that means that in the moment of analyzing the answer the most repeated were related to learning English is fun because the lessons are interactive and different from the others. Participants voted total agree meanwhile 20% were not sure about this reason for learning English language.

3.1.1. Categorical analysis

Main category: participants' motivations for learning EFL. - They are the reasons students have to begin, continue, and finish the linguistics practices using English language during their lessons every day.

Subcategories: (1) cultural access (2) professional opportunities, (3) social communication, (4) educational advantages, (5) traveling benefits, and (6) learning experience perspective.

Sub-categories levels: High, Moderate, Low.

From the categories and subcategories analysis of the participants' voices is extracted the table 2.

Table 2: Analysis of the participants' motivations subcategories for learning EFL

Subcategories	Evidence	Levels
Cultural Access	P1: I don't like speaking English, but it is interesting to watch movies and series in English, but sometimes is difficult to understand what they say, if I know the language would be better.	Moderate
Professional Opportunities	P2: I like English because it helps me to reach new opportunities since English is used in many countries.	High
Social communication	P1: I like English so much because it is the primary language worldwide and many people use it to communicate.	Moderate
Educational Advantages	P1: I like English because it makes things easy at the moment to search information.	High

Traveling Benefits	P1: I like English because I can travel and speak with people from other places.	Low
Learning Experience Perspective	P1: I like English because its lessons are fun and interactive compared to other subjects.	High

The evidence shows that the wish to establish direct communication with people from other countries is probably the main reason for learning EFL in the groups of participants.

3.2. Participants' preferences regarding linguistic practice for learning English language

In answer to the research question 2: What are participants' preferences regarding linguistic practice to learn English? The data collected using a survey is presented in table 3.

Table 3: Linguistics practices participants prefer for learning

Practices	%
Pay attention	1.43%
Interactive Games	54.29%
Watching videos	17.14%
Participate in class	2.86%
Drawing	1.43%
Listening to music	10%
Reading and writing	5.71%
Exercises without a score	1.43%
Speaking	1.43%
Teamwork	1.43%
Use of Technology	1.43%
Teacher good mood	1.43%
Total:	100%

The table 3 shows the participants' preferences concerning linguistic practice to learn English as a foreign language. Most of the answers refer to interactive games as the best practice to improve learning. However, one participant commented

"I learn better playing in a competition because it motivates me to participate"

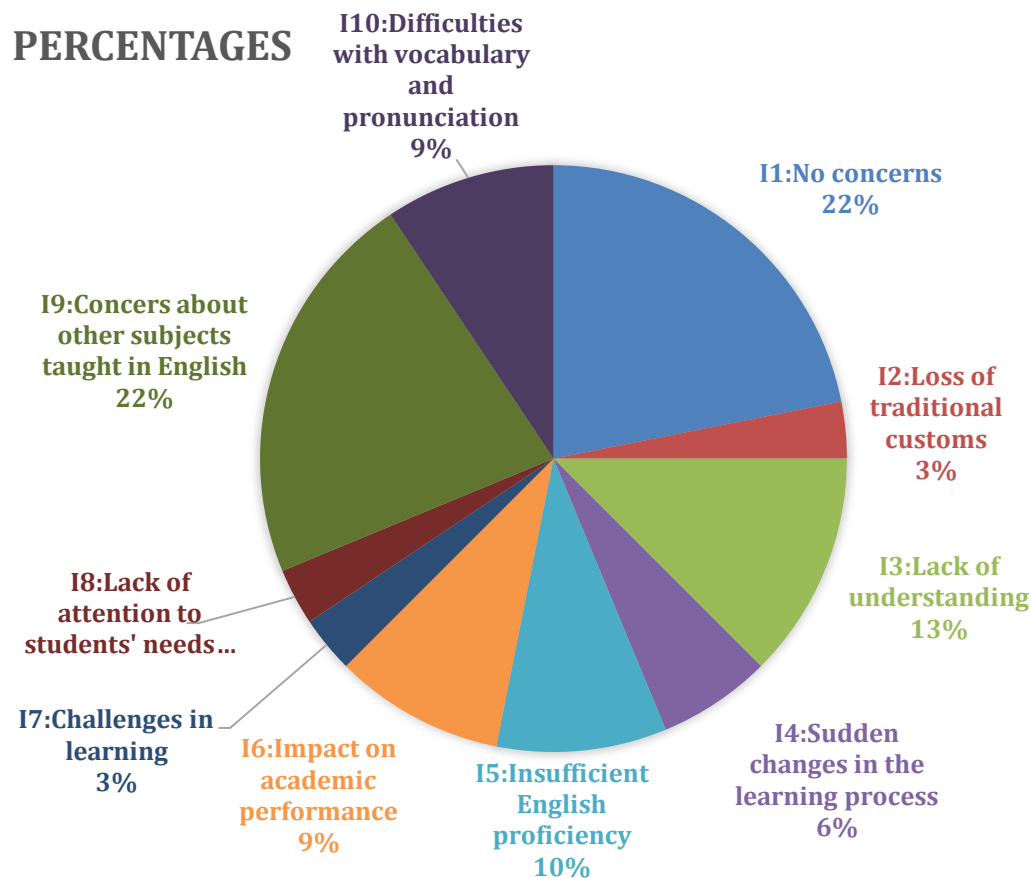
Participant mentioned in his statement one of the principles of gamification which is motivation.

The second percentage that predominates is watching videos, previous the application of this instrument the researcher made students remember the past simple tense by showing a scene from the famous TV series "Friends". Afterwards students were asked to choose a character and act out the scene.

The activity seemed to be enjoyable and it the interpretation of a role is another of the principles of gamification. The third most requested is reading and writing in a lesson the reasons students gave me were related and in summary it is because they can learn and practice at their own pace, without being stressed out by the teachers.

3.3. Participants perceptions concerning the challenge of bilingual education

In answer to question 3: What are the participants' perceptions concerning the challenge of bilingual education? The data is presented in the graphic 1.



Graphic 1: Participants' perceptions having the challenge of bilingualism.

Thus, most of the participants reported no worries before the change to bilingual instruction, which is something attractive considering that the same percentage of students said that they were worried about having several subjects in English language.

Therefore, in the responses obtained most of the students agreed on 3 items, which are item: (5) English language proficiency at the beginning of the process, item (6) Potential negative impact on their academic performances, and item (9) Subjects taught in English language. Consequently, participants perceive worried about not having the enough English level to accept the change, they are worried that having to learn in another language could affect their scores compared to previous years and they are worried about not having the enough vocabulary/pronunciation of technical words before the challenge of bilingual instruction.

3.4. Participants' engagement in practicing EFL through gamification

In response to the research question 4: How engaged are participants in practicing EFL through gamification? The participants' engagement responses appear in the table 4.

Table 4: participants' engagement to practice EFL using games

Engagement Items	0	1	2	3	4	5
I1: Students are actively involved in the game or activity						X
I2: Students follow the rules of the game						X
I3: Students practice the target language structure and vocabulary					X	
I4: Students use English when communicating with others during the game				X		
I5: Students are willing to participate even if they are not fully confident					X	
I6: Students express a positive attitude towards the game					X	

I7: Students show healthy competitiveness without discouraging others	X
I8: Students are continuing to engage even if they make mistakes	X
I9: Students complete tasks or rounds efficiently	X
I10: Students show frustration, anxiety or disengagement	X
I11: Students show improvement as the game progresses	X
I12: Students ask the teacher for clarification about the game when needed	X
I13: Students are enthusiastic about continuing the activity	X

Scale: 0: No experience/No opinion (e.g., I have never experienced this or cannot evaluate it.), 1: Very negative/Strongly disagree (e.g., I feel very frustrated, anxious, or disengaged.), 2: Negative/Disagree (e.g., I feel somewhat frustrated or disconnected.), 3: Neutral (e.g., I neither feel positive nor negative about this experience.), 4: Positive/Agree (e.g., I feel engaged and somewhat enjoy the experience.), 5: Very positive/Strongly agree (e.g., I feel highly engaged and thoroughly enjoy the experience).

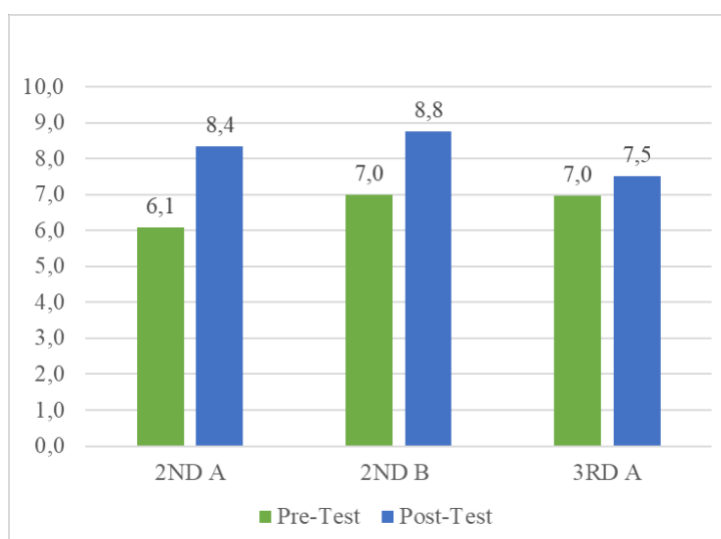
From the participants' responses is possible to infer that -Past Simple Relay- and -Grammar Roulette- are the most accepted games. Participants demonstrated their competence by being actively involved and following the games' rules, however in a classroom not everyone has the same domain of the English language. This was observed in the practice of speaking, vocabulary acquisition, and communication during the practice using games. The limitation of the activity is the diverse participants' EFL knowledge level thus, not all participants have the language level required to speak fluently in English.

Items I7 -Students show healthy competitiveness without discouraging others- and Item I8 -Students are continuing to engage even if they make mistakes- were about the participants' peers communication and linguistic resilience. Those both items can be related due to with the healthy competitiveness the students do not seem affected to make mistakes. In addition, the Item I10 -Students show frustration, anxiety or disengagement- shows that a few students felt frustration in the moment of expressing their opinions because their language knowledge limitations, but most of them were enjoying the activity.

Finally, Item I11 -Students show improvement as the game progresses- is important since at first the students that were wrong with their answers improved due to others' participations, demonstrating that peers' assessment was a good way to indirectly help them improve while the game was progressing.

3.5. Participants' English Language knowledge evolution

In response to the research question 5: What changes in students' English language knowledge are observed at the end of the intervention?



Graphic 2: participants' EFL knowledge evolution when using gamification

The changes are presented in the graphic 2. Data allows to infer that the factor interfered in participants of last year of high school progress is related with their future university studies.

4. Discussion

Based on previous research and the results obtained in the current research, the research team agrees with Bai & Zang (2025), who affirm a global trend among youth who see English fluency as a key factor for success in a globalized world. Thus, the results showed the participants' motivations for learning the English language. It clarifies that bilingualism benefits their future professional careers.

The results about -Practices/Activities that can improve learning- allow the research team to ratify the position of Srivani et al. (2022) and Yuan et al. (2024) concerning students find traditional methodologies not useful and boring. Such selection of methodology depends on teachers' dexterity preparation and imagination. In addition, survey results show that students prefer to play interactive games and watch videos as instruments for learning. Each teacher is free to choose a teaching methodology. However, according to the numbers acquired, the application of gamification has demonstrated benefits, especially considering that it was applied in a bilingual institution, in which English is not only taught in one way.

The lessons used games, images, videos, didactic explanations, movement, music, points for each student, and rewards that they could claim by saving the points they got from participation.

The research inspired the dilemma of transitioning from regular subjects to STEAM subjects. Thus, Mcewin et al. (2025) state students need to grasp the content of each subject to comprehend the ideas and perform tasks. Students' perceptions before the change to bilingual instruction (Table 3) show learners expressed concerns about learning new subjects in the English language, while the other half did not feel uncomfortable with the changes.

The research team agrees with Zolfaghari et al. (2025) that learners appreciate gamification contributions. Such benefits can foster engagement in students during the lessons. The evidence ratifies Song et al. (2025) about gamification and its potential to catch the students' spotlight and prepare their language proficiency to establish an improvement in their scores before and after the educational intervention.

Game design elements in lesson planning helped teenagers improve their English and reduce stress during lesson administration. However, it is necessary to clarify the rewards, progress system, and challenges for students. They need to understand healthy competition. Everyone can accomplish and obtain the rewards.

Meanwhile, gamification was effective during the intervention, but some weaknesses were identified, particularly in group activities. Despite the low-stress environment intended, some students were reluctant to participate in the early classes. It suggests that gamification may not be as suitable for introverted learners as activities, such as Lyrics Training, rely on collaboration.

An unexpected result obtained in this research is related to behavior toward the activities becoming more competitive than anticipated. In addition, the interaction was not very engaging in the first rounds of the activities since they needed some time to accommodate the tasks.

In addition, maintaining student motivation through rewards proved to be challenging. Even though a progression system used a points tracker to reward students, it appeared that those with the highest scores participated less than those with lower averages. The author suggests it may be because students who need to improve their grades put in more effort to earn score rewards. While gamification is a teaching tool, the rewards and progression system must be adapted to accommodate all student needs to ensure equal participation.

Future studies should consider extending the duration of the intervention, application in different schools as privates as publics, and ensuring that instructions are communicated more clearly. Using visual aids, such as graphics, may also help students understand the activities at first sight. Educators interested in implementing this

methodology should thoroughly research how game design elements can be effectively integrated into lesson planning to enhance learning outcomes.

The author hopes that the findings of this study are valuable to those interested in gamification. However, gamification alone is not a complete solution to educational challenges. Based on this research, the investigator believes that a combination of methodologies, such as integrating gamification with game-based learning can lead to more effective results.

5. Conclusion

The authors declare 100% fulfillment of the aims of the research project. It examined the effects of gamification on the transition from traditional English language instruction to bilingual education in Manta-Ecuador. The use of gamification can enhance motivation and language proficiency in the participants. The comparison between pre-test and post-test results indicates that gamification improves English language proficiency, with scores increasing from 6.1 to 8.4 and 7.0 to 8.8. Additionally, the participants' attitudes toward the lessons resulted in scores from 2 to 5, with 5 indicating a very positive attitude towards the game. 2 indicating frustration or disconnection. Most of the participants' responses were good when administering gamification in the process of EFL learning is enjoyable. Based on these results, the authors conclude that gamification helps to reduce stress levels and increases students' motivation for learning a foreign language.

In conclusion, game design elements can be beneficial in the transition from traditional English instruction to bilingual education. These results can guide curriculum designers in innovating EFL classroom practices and help educational administrators reconsider teaching methodologies based on student feedback. The participants showed interest in gamification as a didactic strategy that encouraged them to step out of their comfort zones. However, a limitation of this study is the execution in only one educational institution with a sample of 81 participants. Thus, the data corpus does not allow a generalization. Future research should explore its application in diverse schools, not necessarily for bilingual education, but for enhancing English proficiency. The research encourages further studies on game design elements in longer interventions and hopes this work contributes to improving EFL teaching strategies in both public and private educational settings in Ecuador and similar contexts worldwide. Through this study, the researchers expect to contribute to the ongoing innovation in English instruction across Latin America and, more importantly, support the transition to bilingual education through gamification.

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