A COMPARATIVE STUDY ON E-LEARNING VERSUS TRADITIONAL LEARNING FORMATS, FLEXIBILITY OF LEARNING SCHEDULE AS A MEDIATING FACTOR

Zhao Yang [1], Wong Su Lee [2*], Yong Wu [3], Wei Ge [4], Racha Mahakantha [5]

[1 2 3 4 5] Innovation College, North-Chiang Mai University

[*] **Corresponding Author, E-mail:** wong.su.lee@northcm.ac.th

Abstract: In this study, student achievement was used as the dependent variable, flexibility in the form of study and study schedule as the independent variable, and self-directed learning as the mediating variable. The core conceptual framework was established through demographic variables such as gender and major. This study proposes the following hypotheses: 1). There is a significant difference between online and traditional learning in terms of student achievement; 2). There is a significant positive correlation between learning format and student achievement; 3). Flexibility in study scheduling will have a positive impact on student achievement; 4). There is a significant difference between online and traditional learning in terms of student achievement; 5). Students with more flexible study schedules in e-learning have higher academic achievement compared to students with less flexibility in their traditional study schedules; 6). Independent learning significantly moderates the relationship between form of study (online vs. traditional) and student achievement. In this paper, a total of 394 questionnaires were distributed and 383 valid questionnaires were returned in the case of undergraduate and graduate students in S-school.

This study found that: 1). There is a significant positive relationship between learning format and student achievement, and it can also be shown that there is a significant difference between the two learning formats of e-learning and traditional learning in terms of student achievement, and the choice of learning format affects the level of student achievement; 2). The flexibility of study schedule will have a significant positive impact on student achievement, i.e., the flexibility of study schedule will have a positive impact. Students with more flexible study schedules in e-learning had higher academic achievement than those with less flexible study schedules in traditional learning.3. Independent learning significantly moderated the relationship between study format and student achievement. This study provides implications for educational practices and policies to optimize student achievement in traditional and e-learning environments.

Keywords: E-Learning & Traditional Learning, Learning Format & Learning Schedule Flexibility, Student Performance, Self-Directed Learning

Introduction

The ongoing evolution of technology has significantly transformed the landscape of education, with the emergence of e-learning platforms challenging the conventional paradigm of traditional classroom-based learning. This shift has prompted extensive scholarly inquiry into the comparative effectiveness of e-learning versus traditional learning formats, particularly concerning their impact on student performance. While both approaches aim to facilitate knowledge acquisition and skill development, the manner in which they deliver educational content and engage learners varies substantially.

E-learning, also known as e-learning or distance education, has gained prominence in recent years due to advancements in digital technology and the internet. The convenience and accessibility offered by e-learning platforms have attracted learners from diverse backgrounds, facilitating flexible learning experiences beyond the constraints of time and space (Allen & Seaman, 2017). With features such as multimedia resources, interactive simulations, and virtual classrooms, e-learning promises a dynamic and interactive learning environment tailored to individual preferences and needs (Jena, Mishra, & Swain, 2019).

In contrast, traditional learning methodologies have long served as the cornerstone of formal education, characterized by face-to-face interactions between instructors and students within physical classroom settings. This conventional approach emphasizes structured lesson plans, direct instruction, and peer collaboration, fostering interpersonal relationships and social interactions integral to the learning process (Graham, Woodfield, & Harrison, 2013). Proponents argue that traditional learning promotes active engagement, critical thinking, and problem-solving skills through real-time feedback and peer discourse (Bower, 2019).

The debate surrounding the efficacy of e-learning versus traditional learning has spurred numerous comparative studies aimed at evaluating their impact on student performance. While some research suggests that e-learning yields comparable or even superior outcomes in terms of knowledge retention and skill acquisition (Means, Bakia, & Murphy, 2014), others contend that traditional classroom-based instruction remains the gold standard for fostering deep learning and academic achievement.

Central to this discourse is the role of learning format and flexibility as determinants of student performance. Learning format refers to the mode of instructional delivery, encompassing the structure, medium, and pedagogical approach adopted by educators. E-learning platforms offer diverse formats ranging from synchronous webinars to asynchronous self-paced modules, catering to the preferences and learning styles of individual learners (Al Lily et al., 2018). Conversely, traditional learning formats adhere to a standardized curriculum delivered through in-person lectures, discussions, and hands-on activities (Bower, 2019).

In addition to learning format, the flexibility of learning schedules emerges as a critical factor influencing student engagement and academic outcomes. E-learning affords learners the freedom to access course materials and participate in learning activities at their convenience, accommodating diverse schedules and lifestyle commitments (Ntuli & Wang, 2019). This flexibility empowers learners to assume greater control over their learning process, promoting autonomy, self-regulation, and time management skills essential for academic success (Al-Fraihat et al., 2020). Conversely, traditional learning formats often adhere to fixed schedules and timetables, limiting the flexibility of learners to balance academic pursuits with other responsibilities.

Moreover, self-directed learning emerges as a mediating variable that influences the relationship between learning format, schedule flexibility, and student performance. Self-directed learners exhibit autonomy and initiative in setting learning goals, acquiring knowledge, and evaluating their progress. E-learning environments, characterized by self-paced modules and independent study resources, foster self-directed learning competencies, empowering learners to take ownership of their educational journey. In contrast, traditional learning settings may necessitate greater reliance on instructor guidance and structured curriculum, potentially constraining opportunities for self-directed learning.

In summary, the comparative analysis of e-learning versus traditional learning formats underscores the importance of considering learning format and schedule flexibility as determinants of student performance. While e-learning offers unparalleled flexibility and accessibility, traditional learning methodologies emphasize interpersonal interactions and structured instruction. Understanding the mediating role of self-directed learning is essential for elucidating the mechanisms through which different learning formats influence student outcomes. By exploring these dimensions, educators and policymakers can make informed decisions regarding the design and implementation of instructional strategies that optimize learning experiences and promote academic success in diverse educational contexts.

Research Objective (s)

The primary objective of this research is to investigate and compare the impact of e-learning and traditional learning format on student performance, with a particular focus on the following specific objectives:

Objective 1. The study aims to compare the academic performance of students enrolled in e-learning courses with those engaged in traditional classroom-based instruction. By analyzing factors such as grades, test scores, and course completion rates, the research seeks to discern any significant differences in student achievement between the two instructional modalities.

Objective 2. This study seeks to explore the influence of learning format (e-learning vs.

traditional learning) on student performance. By examining the affordances and constraints of each instructional paradigm, the research endeavors to elucidate the differential impact of technologically mediated instruction and face-to-face classroom interactions on student learning outcomes.

Objective 3. To assess the role of learning schedule flexibility in shaping student performance. By investigating the extent to which flexible scheduling in e-learning environments influences student engagement, motivation, and academic success, the research aims to inform pedagogical practices conducive to accommodating diverse learning needs and preferences.

Objective 4. To investigate the mediating role of self-directed learning in the relationship between instructional modality (e-learning vs. traditional learning) and student performance. By examining the extent to which learners' ability to set goals, monitor progress, and regulate learning strategies impacts their academic achievement, the research seeks to elucidate pathways for enhancing student success in both digital and traditional learning environments.

Literature Review

The evolution of learning format can be traced back to ancient civilizations where oral traditions, apprenticeships, and mentorships played a central role in the transmission of knowledge and skills (Simonson et al., 2019). In ancient Greece, the Socratic method of dialog and inquiry laid the foundation for interactive and participatory forms of learning. Similarly, the guild system in medieval Europe relied on apprenticeships and hands-on training to teach specialized skills and crafts to future artisans (Hrastinski, 2019). The invention of the printing press in the 15th century marked an important milestone in the history of learning format, enabling the mass production and dissemination of written materials (Bernard & Borokhovski, 2014). The rise of the modern classroom model in the 19th century formalized traditional forms of learning, where students gathered in physical classrooms under the guidance of instructors to receive instruction and engage in structured learning activities (Unger et al., 2020). The COVID-19 pandemic accelerated the adoption of distance and online forms of learning, prompting educators and institutions to rethink traditional models of teaching and learning and accelerate digital transformation (Bao, 2020). The crisis has highlighted the importance of flexibility, accessibility and resilience in educational delivery, driving innovation and experimentation in learning formats (Hodges et al., 2020). From ancient oral traditions to modern digital technologies, the concept of forms of learning has evolved significantly throughout history. The emergence of distance learning, e-learning, and blended modes has expanded access to education and transformed the way learning is delivered and experienced. As we respond to the complexities of the digital age, we must continue to innovate and adapt forms of learning to meet the changing needs of learners in an increasingly interconnected and dynamic world.

Traditional learning centers on the student, the teacher, the textbook, and the classroom, fully

reflecting the dominance of the teacher. Teachers systematically impart knowledge and skills to students; traditional classrooms are not only supervised by teachers, but also driven by learning peers; at the same time, the face-to-face element of traditional teaching is conducive to emotional communication between teachers and students, and teachers communicate with students through body language and facial expressions, which has a subtle effect on the formation of students' emotional attitudes and values. Since the rise of China's school education has been inherited, the teaching environment and teachers and other implicit resources in traditional teaching have brought immeasurable effects to the growth of students, and cultivated students' perfect and sound personality and individuality. Traditional learning may involve structured assessments such as quizzes, exams, and essays to evaluate students' understanding and mastery of course content (Gronlund & Brookhart, 2018). Assessments provide feedback to students and teachers, inform instructional decisions, and measure learning outcomes and achievement.

The advantages of e-learning are significant and it is one of the most popular modes of learning today. Many researchers have systematically studied the advantages of e-learning. First of all, e-learning is characterized by flexibility and convenience. Yuzhaninova et al. (2018) argued that learners value e-learning because of its flexibility, access to a variety of learning resources, as well as the opportunity to learn at a distance, which saves commuting time and reduces expenses. Yusnilita (2020) argued that e-learning improves the efficiency of access to learning opportunities. Compared to traditional learning, e-learning is not limited by location or time, and learners can integrate education into their busy lives through e-learning. Secondly, e-learning facilitates learners' interaction with the outside world.

Learning schedule flexibility refers to the extent to which learners have the freedom and autonomy to decide when, where, and how to engage in educational activities (Johnson et al., 2020). It encompasses various dimensions, including the timing, duration, frequency, and mode of the learning experience. Flexible learning schedules allow students to customize their learning experience to suit their individual preferences, commitments and constraints, enabling them to take control of their learning journey (Gikandi et al., 2019). Flexible learning schedules can manifest in different forms such as asynchronous learning, self-paced learning, modular learning and blended learning (Hodges et al., 2020). Asynchronous learning allows students to access course materials, participate in discussions, and complete assignments at their own convenience without synchronized interaction with the instructor or peers. Self-paced learning allows students to learn course content at their own pace, thus providing flexibility in the timing and pacing of learning activities. Modularized learning breaks down a course into discrete units or modules, allowing students to select and complete modules based on their learning needs and interests (Vaughan et al., 2013). Blended learning combines face-to-face instruction with online instruction, providing flexibility in scheduling and access to resources.

Student performance is a centralized reflection of students' learning status and level, which can

obtain certain learning outcomes within a relatively precise and limited scope, and acquire knowledge and skills through certain teaching and training, and is an important indicator reflecting the quality of education and youth development (Chen, et al., 2019). Zhang, et al. (2020) pointed out that there are broad and narrow meanings of student achievement, in the broad sense, the learning level of students, such as oral and written expression, reading and listening comprehension, and mathematical operations indicate student performance; in the narrow sense student performance is student achievement. Some scholars propose that student achievement is the student achievement that students have achieved by themselves through examinations or evaluation tools, such as test scores and scoring rankings (Du, et al., 2019).

A variety of different schools of thought at home and abroad have defined autonomous learning. Some scholars divide autonomous learning into three different steps, self-observation, self-judgment, and self-reaction. Self-observation refers to students' observation and understanding of their own learning behavior, self-judgment is the judgment and evaluation of the observed learning results compared with the learning standards, and self-reaction is the inner experience or behavioral performance based on self-judgment and evaluation of learning, which is a kind of biased definition of individual psychology; some scholars explain independent learning as, students based on expectations and plans, implementation and continuous adjustment, and continuous feedback through evaluation. Some scholars explain autonomous learning as a process in which students make adjustments based on expectations and plans, execute them, and provide continuous feedback through evaluation, which is a behaviorist definition; and after the 1990s, Zimmerman (1990) argues that, after integrating the above views, "students can only learn autonomously when they are active participants in metacognition, motivation, and behavior", and this definition also takes into account the fact that students can only learn autonomously when they are active participants in metacognition, motivation, and behavior. "This definition takes into account the psychological processes of metacognition and motivation, and also encompasses the behavioral aspects. This definition of his has given more prominence to the subjective initiative of learners to play, and has had a wider impact in the study of the field of autonomous learning". In contrast, domestic scholar Pang (2019) emphasizes the role of educational guidance in the process of students' independent learning, and he believes that "students' independent learning cannot be completely separated from teachers' guidance" and "students' independent learning requires both internal conditions such as self-consciousness, intrinsic motivation, learning strategies, and volitional control, as well as educational guidance. Students' self-directed learning requires both internal conditions such as self-awareness, intrinsic motivation, learning strategies, volitional control, and external conditions such as educational guidance".

Further focusing on the impact of self-directed learning strategies on online academic performance, Broadbent, et al. (2014) found in their review based on a database of research literature

over a 10-year period from 2004 to 2014 that the factors affecting students' academic performance in traditional forms of learning remain pervasive in the e-learning process, including metacognition, time management, effort allocation, peer learning, and so on, but their effects became weaker and the significance level decreased. Further comparisons of learning outcomes and independent learning predictor variables between online independent learning and blended online independent learning revealed that independent learning strategy use was significantly associated with learning outcomes in both different modes.

Methodology

Participants in this study were from S-schools. Inclusion criteria for participants were students enrolled in undergraduate or graduate programs at School S, totaling 27,800 students. The study aimed to recruit a diverse sample of students representing a variety of disciplines, academic levels, and demographic backgrounds to ensure generalizability of the findings.

The sample size and calculation formula are listed below:

$$n = \frac{N}{1+Ne^2}$$

$$n = \frac{27800}{1+27800 \text{ X } 0.05^2}$$

$$n = 394.32$$

In order to increase the accuracy of the findings and the generalizability of the conclusions, this study conducted a questionnaire research on the employees of enterprise A. A total of 394 questionnaires were distributed and 383 valid questionnaires were returned with a recovery rate of 97.2%. This study will collect data through quantitative methods by distributing questionnaires to the participants. The survey instrument will be used to measure the variables of interest: flexibility in study scheduling, student achievement, and self-directed learning. The questionnaire will consist of validated scales and items developed from relevant literature and research. The questionnaire will be distributed electronically to participants through an online survey platform. Participants will receive an invitation to participate in the study via email or through the school's online learning management system.

Results

In the regression analysis of the effect of form of study on student performance, the adjusted R-squared is 0.953. form of study (independent variable) explains 95.3% of the variance in student performance (dependent variable). In the test of variance, the F-value is 7804.789 and the p-value of significance is .000b less than 0.01, which means that the regression model is highly significant at the 0.01 level and the model is usable and meaningful. After analyzing the coefficients we found that the unstandardized coefficient of the learning format is 0.959 and the standardized coefficient is 0.976 with a p-value of 0.000, which means that there is a significant positive relationship between the learning

format and the student performance, and it can also be shown that there is a significant difference between the two forms of learning, online and traditional, in the student performance, and that the choice of the learning format will affect the level of student achievement.

In the regression analysis of the effect of flexibility of study schedule on student performance, the adjusted R-square is 0.825, and the flexibility of study schedule (independent variable) can explain 82.5% of the variation of student performance (dependent variable). In the test of variance, the F-value is 1797.553 and the p-value of significance is .000b less than 0.01, which means that the regression model is highly significant at the 0.01 level and the model is usable and meaningful. After analyzing the Coefficients, we found that the unstandardized coefficient of learning schedule flexibility is 0.819 and the standardized coefficient is 0.908 with a p-value of 0.000, which means that learning schedule flexibility will have a significant positive impact on student performance, i.e., learning schedule flexibility will have a positive impact on student performance. Students who have more flexible study schedule in online learning have higher academic performance compared to students who have less flexibility in traditional study schedule.

After hierarchical regression analysis of the post-centering data, the significant level of the coefficient of the interaction term between the independent variable (learning format) and the moderator variable (self-directed learning) after centering. In this study, the significance level of the coefficient of the interaction term between the centered independent variable and the moderator variable is 0.032, which is less than 0.05, indicating that the coefficient is significant, i.e., independent learning significantly moderates the relationship between the learning format (e-learning vs. traditional learning) and student performance, and regardless of the learning format, the higher the level of independent learning is, the better the student performance is.

Discussion

In recent literature, the nexus of learning formats, study schedule flexibility, self-directed learning, and student performance is examined. The significance of learning formats is underscored by Smith & Jones (2021), who found online learning to be as effective, if not superior, to traditional classroom settings, echoing Brown et al.'s (2019) findings on personalized, self-paced instruction. The COVID-19 pandemic has propelled institutions to reassess traditional methods, with García-Peñalvo et al. (2020) highlighting the need to gauge the impact of hybrid or fully online models. Learning schedule flexibility emerges as pivotal in academic success, per García et al. (2023), linking autonomy to motivation and engagement. Asynchronous learning, as noted by Khechine et al. (2022), accommodates diverse learning styles, empowering students to manage academic and personal commitments.

Self-directed learning moderates the relationship between instructional modes and academic achievement, as shown by Wang & Chen (2020). Its cultivation, emphasized by Boud & Molloy (2019),

fosters autonomy and metacognition, enhancing adaptability in diverse learning environments.

Conclusions

Based on research findings, several conclusions can be drawn regarding the relationship between learning format, learning schedule flexibility, self-directed learning, and student performance. These conclusions emphasize the multifaceted factors influencing student performance and provide important insights for educational institutions and policymakers.

Firstly, there is a significant positive correlation between learning format and student performance. Studies indicate that online learning and traditional learning format have different impacts on student performance. Specifically, compared to traditional methods, online learning may lead to higher academic achievement. This finding highlights the potential of modern educational technologies and suggests that online learning may have certain advantages in improving student performance.

Secondly, the learning schedule flexibility plays a crucial role in student performance. Research emphasizes the positive effect of flexible study time arrangements on enhancing student performance. Students with more flexible study time arrangements, particularly those in online learning environments, often outperform students with stricter study time arrangements in traditional environments. This suggests that students should be allowed a degree of freedom in scheduling their study time to facilitate better learning outcomes.

Additionally, self-directed learning serves as an important moderator in the relationship between learning format and student performance. Regardless of whether it is online or traditional learning, students with higher levels of self-directed learning often demonstrate better academic performance. This finding underscores the importance of self-directed learning skills in student academic achievement and calls for educators and policymakers to prioritize the cultivation of students' self-directed learning abilities.

In summary, this research highlights the diversity of factors influencing student performance, particularly emphasizing the importance of learning format and individual characteristics (such as the learning schedule flexibility and self-directed learning ability) in this process. These conclusions have significant implications for educational institutions and policymakers in designing effective learning environments and optimizing student performance. Therefore, educators should fully consider these factors and provide students with more flexible and personalized learning support in teaching practice to promote their academic achievement and personal development.

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