The Evolution Of Education In The Digital Era: Examining The Impact Of Blended Learning And Self-Directed Learning On Student Achievement In Principles Of Accounting

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ARTICLE INFO	ABSTRACT
	The integration of innovative pedagogical approaches, such as blended learning and self-directed learning, has garnered significant attention in modern education. This study investigates their influence on student achievement in Principles of Accounting. Through a survey of 400 form four students in secondary schools in the Southern Zone of Malaysia, namely in the states of Johor, Melaka, and Negeri Sembilan to identify the influence of computer technology in blended learning on achievement. Data were collected using adapted and modified questionnaires from previous studies. Inferential data analysis was conducted using the Smart PLS analysis technique. Smart PLS version 4.0 software was utilized to assess relationships and mediation effects in the study. Results indicate significant relationships between blended learning elements, self-directed learning, and student achievement. Mediation analysis reveals full mediation between school and self-directed learning, and complementary mediation for teachers and content with partial mediation. Supported hypotheses underscore the significant impact of blended learning components on student achievement. The results suggest that blended learning, when coupled with self-directed learning principles, plays a pivotal role in enhancing student achievement in Accounting Principles. This study contributes to the growing body of literature on innovative pedagogical approaches and underscores the importance of leveraging technology in modern education. **Keywords**: Blended learning, Self-directed learning, Student achievement, Principles of Accounting

1.0 Introduction

The world of education is experiencing drastic changes, rapidly moving towards globalization with technological advancements. Teachers must be proactive and align their teaching methods with these contemporary changes. New normal learning, comparable to that in developed countries, utilizes technology to make the learning process engaging and effective. The teaching techniques employed by a teacher in the classroom are crucial in fostering students' interest and inclination towards a particular subject in school (Bozkurt et al., 2020).

Blended Learning is a concept that combines e-learning methods with conventional methods, offering solutions and numerous benefits in improving student achievement (Rasmitadila et al., 2020). It is also a way to achieve learning objectives by enhancing students' interest and performance, providing them with engaging and meaningful learning experiences. Online learning significantly enhances the learning impact as it gives students more control over when, where, and how they learn. This facilitates direct discussions and interviews within networks and provides up-to-date information tailored to the individual needs of students. Online learning also offers various simulations, animations, practical activities, exercises, and applications beneficial to students (Al-Shunnaq & Bani, 2010). Usman Tunde (2023) further states that an essential aspect of blended

learning is the enhanced social interaction between students and instructors, made more effective with the help of modern technology.

The advancement of mobile devices enables students to access online resources anytime, at their own pace, and away from the physical school buildings (Hill et al., 2017). Over the past two decades, curricula and teaching methods have evolved, requiring students to take greater responsibility for their own learning (Carpenter & Pease, 2013). Carpenter and Pease (2013) argue that teachers should shift from solely focusing on core content to providing learning activities that help develop skills enabling students to become active lifelong learners.

According to Taylor (2017) and Salameh (2005), a crucial feature of blended learning is the availability of face-to-face communication, which fosters interaction between students and teachers, among students, and with broader learning materials. Blended learning also offers benefits in enhancing face-to-face communication, thereby improving interactions between students and teachers, among students, and with learning materials. Additionally, it helps reduce teaching costs and improves understanding of the subject matter (Gambari et al., 2017).

Self-Directed Learning (SDL) is a learning approach that allows students to learn under their own control and capability. Effective SDL requires guidance from various aspects, including determining what to learn, the time needed to learn, how to learn, and when to learn (Tullis & Benjamin, 2012). According to Tinjol & Andin (2020), SDL also requires students to plan and manage their learning activities, develop and complete projects, and enhance individual knowledge and skills. It involves reading activities, collaboration in study groups, accessing electronic information, and reflective writing between teachers and students.

Research findings by Farajollahi & Moenikiam (2010) on the comparison of SDL strategies in online learning and printed materials indicate that students are more interested in learning. SDL through blended learning also helps students achieve higher scores than those learning with printed materials. Additionally, Hill et al.,(2017) found that online learning influences student learning outcomes and that blended learning is becoming more popular among students, who learn best using online tools and face-to-face interaction.

In Malaysia, the emphasis and exposure to teaching and learning by applying computer technology in blended and self-directed learning are still in the early stages. Many schools have begun adopting and implementing ICT solutions, such as e-learning, as a flexible teaching and learning resource both inside and outside the classroom to enhance student understanding and achievement in various subjects (Al Lily et al., 2020). Therefore, this study aims to examine students' perceptions of whether there is a relationship between the elements of blended learning and student achievement, mediated by self-directed learning.

2.0 Background

Blended learning is an approach that combines face-to-face learning with online learning (Farahiza, 2010). Its goal is to maximize understanding of principles, theories, and knowledge. Blended learning is a student-centered approach where students can control their own learning pace and utilize various online technologies. This study is guided by the Complex Adaptive Blended Learning System (CABLS) Model framework. The CABLS model has been used to identify the effectiveness of blended learning in the subject of Principles of Accounting. This research promotes a comprehensive understanding of what has been achieved and what needs to be accomplished in blended learning, both in terms of the elements combined and the roles performed effectively. According to Wang et al. (2015), a significant model of blended learning combines elements such as teachers, technology, instructional content, students, learning environment, and institutional support to enhance student achievement in the subject of Principles of Accounting.

Self-directed learning is based on Bandura's Theory (1989), which states that self-directed learning represents the relationship between personal processes, behavior, and the changing environment during the learning process (Alimohammadi et al., 2020). Self-directed learning enables individuals to set goals, control their learning, monitor their work, and engage in reflection (Carpenter & Pease, 2013). This study examines students' readiness to engage in self-directed learning within the practice of blended learning. According to Zimmerman et al. (2011), self-directed learning readiness is the level of awareness when individuals recognize their own strengths and potential for learning. Students' readiness for self-directed learning is determined by their self-management, desire to learn, and self-control. The elements of self-directed learning studied include self-management, desire to learn, and self-control of the students.

The theory of self-directed learning readiness is flexible and can be modified over time with possible interventions (Cerezo et al., 2019). An individual's self-directed learning strategies are not fixed and evolve with maturity and time (Andrzejewski et al., 2016). Cerezo et al. (2019) state that when weak self-directed learning strategies are improved and enhanced in use, it can lead to higher student achievement and overall academic success.

Self-directed learning is crucial for academic success. Therefore, it is essential to support, improve, and maintain self-directed learning skills (Vanslambrouck et al., 2019). Self-regulated learning is an important variable for success, particularly in blended education (Supramaniam et al., 2023). According to Corebima (2009), self-directed learning can be enhanced or trained through specific strategies or efforts via blended learning. Self-directed learning will be reflected when students engage in discussions to gain clarification. Through discussion activities, students can discover what they have learned and what they do not yet know. Such activities enable students to become more independent learners (Bahri et al., 2019).

In this study, only four elements from the CABLS model were considered: School, Teacher, Content, and Technology, which can help implement blended learning in schools and are suitable for Malaysian school conditions. Therefore, the CABLS theory has been used in this study to identify the relationship between blended learning, consisting of elements from the school, teacher, content, and technology, with self-directed learning, consisting of elements of self-management, self-control, and desire to learn as mediators in improving the achievement of the Principles of Accounting subject.

The development of a blended learning model for the subject of Principles of Accounting allows the Ministry of Education to adapt and expand it throughout Malaysia, facilitating an enjoyable teaching and learning process and enhancing student interest and performance in the subject. Consequently, the findings of this study can benefit society, particularly school management, teachers, and students, in bringing innovation to the increasingly challenging world of education.

3.0 Research Objectives

This study aims to identify the influence of blended learning using computer technology on the achievement of Principles of Accounting subject, with self-directed learning as the mediator among students taking Principles of Accounting as an elective.

The specific objectives of this study are:

To determine whether there is a relationship between the elements of Blended Learning and student achievement in the Principles of Accounting subject, mediated by Self-Directed Learning.

4.0 Research Question

Based on the listed research objectives, this study will be conducted to address the following question:

Is there a relationship between the elements of Blended Learning (School, Teacher, Content, and Technology) and Student Achievement in the Principles of Accounting subject, mediated by Self-Directed Learning?

5.0 Research Methodology

This study adopts a survey research design (Creswell, 2011) utilizing a questionnaire as the instrument and employs a quantitative approach. The instrument used in this study was adapted and modified from previous studies by Wang et al., (2015) and Halim et al., (2016) regarding blended learning and students' perceptions of blended learning. Items from these instruments were adapted for the current study as the research field is similar. They are also suitable for the research objectives, and the items are appropriate due to the similar study factors and sample. The questionnaire instrument, consisting of 79 items, comprises three main components: blended learning, self-directed learning, and student achievement (exam results of monthly tests, mid-year exams, and final exams). The adapted questionnaire instrument was sent to experts for content and face validity. The questionnaire was revised based on experts' suggestions to ensure content validity and alignment with the research objectives. A total of 400 Form Four students from secondary schools in the states of Johor, Negeri Sembilan, and Melaka, taking the Principles of Accounting subject, were randomly selected as the sample for this study.

In summary, the questionnaire used in this study consists of items related to the Influence of Blended Learning and Self-Directed Learning. To determine the relationship between the elements of Blended Learning (School, Teacher, Content, and Technology) and Student Achievement mediated by Self-Directed Learning, Smart PLS SEM 4.0 analysis was employed to assess the measurement and structural model relationships.

6.0 Findings

6.1 Testing Relationship Hypotheses and Path Coefficients for Direct Hypotheses

Coefficient path analysis was conducted to measure and identify which relationships are most important and which may not be important in a study. Path coefficient values indicate the strength of a relationship between variables. Although the t-value is calculated through bootstrapping, it is used to test whether the tested relationship is significant or not (Ringle et al.,2022) In this study, the researcher used the bootstrap technique in hypothesis testing to determine path coefficient values to identify significant relationships between variables. The analysis was conducted on 5000 bootstrap samples and 400 cases to obtain p-values.

According to Hair et al., (2017), path coefficients should exceed 0.100 to consider a certain effect in the model and be significant at least at the 0.05 level. Based on Table 1, exogenous variables such as Blended Learning (School, Teacher, Content, and Technology) and Self-Directed Learning (Self-Management, Desire to Learn, Self-Control) have a significant relationship with the endogenous variable, which is Achievement, with P-values.

Table 1.Results of the Direct Relationship Hypothesis Test

Hypothesis	P-Value	Outcome
School -> Self-Management	0.042*	Supported
School -> Willingness to Learn	0.038*	Supported
School -> Self-Control	0.000**	Supported
School -> Achievement	0.355	Not Supported
Teacher -> Self-Management	0.215	Not Supported
Teacher -> Willingness to Learn	0.478	Not Supported
Teacher -> Self-Control	0.001**	Supported
Teacher -> Achievement	0.001**	Supported
Content -> Self-Management	0.000**	Supported
Content -> Willingness to Learn	0.000**	Supported
Content -> Self-Control	0.004**	Supported
Content -> Achievement	0.001**	Supported
Technology -> Self-Management	0.000**	Supported
Technology -> Willingness to Learn	0.006**	Supported
Technology -> Self-Control	0.000**	Supported
Technology -> Achievement	0.110	Not Supported
Self-Management -> Achievement	0.001**	Supported
Willingness to Learn -> Achievement	0.001**	Supported
Self-Control -> Achievement	0.004**	Supported

**$p<0.01$; *$p<0.05$ significant

In conclusion, within the Blended Learning and Self-Directed Learning with Achievement construct, 15 variables have significant relationships, while four variables do not. This implies that the Blended Learning construct has a significant relationship in enhancing student achievement in the Principles of Accounting subject.

6.2 Results of Systematic Mediation Analysis Method

Systematic mediation analysis relies on a theoretically established model and hypothesized relationships, including the mediation effects. To initiate this process, it is crucial to assess and evaluate a model involving all considered mediator variables. The next steps involve interpreting the results of the mediation analysis and testing the mediation effects.

Many PLS path models include mediation effects, but they are often not explicitly hypothesized and tested (Hair et al., 2023). Only when theoretically plausible and empirically testable mediations are considered can the nature of cause-and-effect relationships be fully and accurately understood. Thus, theory will always be the foundation of empirical analysis, including mediation (Richter et al.,2016).

Mediation occurs when a third mediator variable intervenes between two related constructs. More precisely, it can be stated that changes in exogenous constructs lead to changes in the mediator variable, which subsequently results in changes in the endogenous constructs in the PLS path model Nitzl et al., (2016) and Cepeda et al., (2017). Therefore, the mediator variable controls the nature (i.e., the underlying mechanism or process) of the relationship between two constructs.

According to Hair et al., (2017) analyzing the strength of the mediator variable's relationship with other constructs allows the validation of the underlying mechanisms of the cause-and-effect relationship between exogenous and endogenous constructs. In its simplest form, the analysis considers only one mediator variable, but the path model can encompass multiple mediator variables simultaneously (multiple mediator analysis).

Baron and Kenny (1986) introduced an approach to mediation analysis known as the step-by-step causal approach, which is still widely used by researchers routinely to this day (Rasoolimanesh et al., 2021). However, more recent research has concluded that there are conceptual and methodological issues with Baron and Kenny's approach Zhao et al., (2010). In line with this, the researcher constructs upon the mediator framework with the perspective of Zhao et al., (2010), offering a synthesis of previous research on mediation analysis and guidelines for future research (Nitzl et al., 2016).

In this context, Zhao et al.(2010) procedures closely align with Baron and Kenny's (1986) concepts of mediation, which include complementary mediation, competitive mediation, and indirect-only mediation.
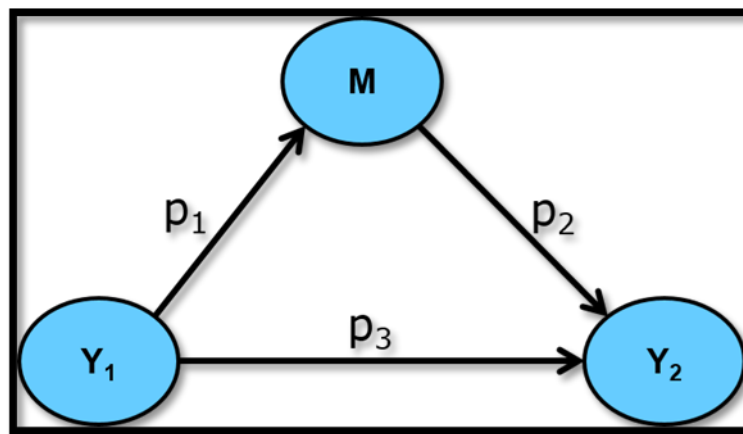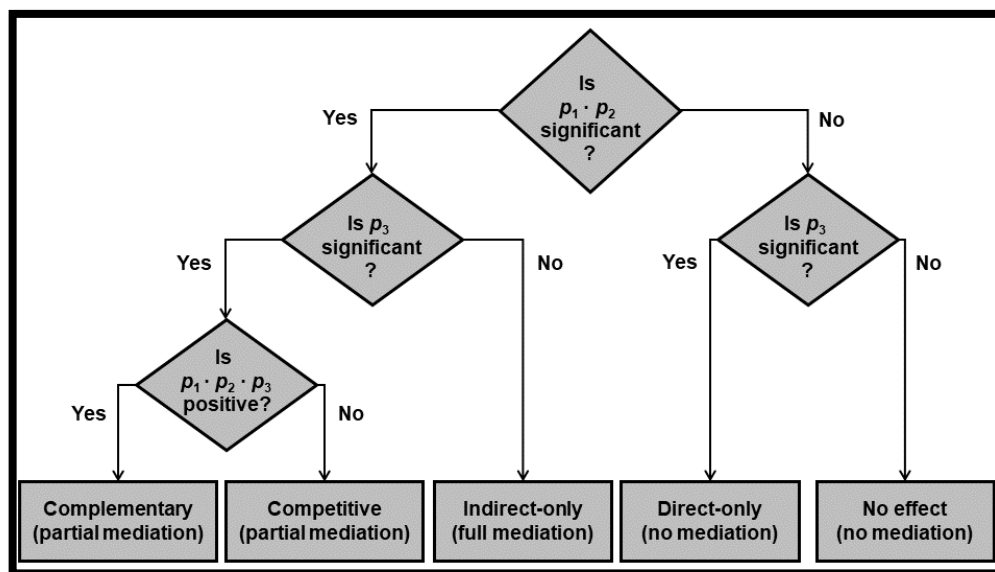
Figure 1: Mediation model (Hair et al., 2021)

Figure 2: Mediator Analysis Procedures (Zhao et al., 2010)

Table 2: Table Analysing the Effects of the Mediating Relationship of Blended Learning, Self-Directed Learning with Achievement

Relationship	P1 Value	Relationship	P2 Value	Relationship	P3 Value	Step 1	Step 2	Step 3	Conclusion
School -> Desire to Learn	0.038*	Desire to Learn -> Achievement	0.001*	School -> Achievement	0.355**	YES	NO	Indirect Only - (Full Mediation)	
School -> Self-Control	0.000*	Self-Control -> Achievement	0.004*	School -> Achievement	0.355**	YES	NO	Indirect Only - (Full Mediation)	
School -> Self-Management	0.042*	Self-Management -> Achievement	0.001*	School -> Achievement	0.355**	YES	NO	Indirect Only - (Full Mediation)	
Teacher -> Desire to Learn	0.478**	Desire to Learn -> Achievement	0.001*	Teacher -> Achievement	0.001*	NO	YES	Direct Only - (No Mediation)	
Teacher -> Self-Control	0.001*	Self-Control -> Achievement	0.004*	Teacher -> Achievement	0.001*	YES	YES	YES	Complementary (Partial Mediation)
Teacher -> Self-Management	0.215**	Self-Management -> Achievement	0.001*	Teacher -> Achievement	0.001*	NO	YES	Direct Only - (No Mediation)	
Content -> Desire to Learn	0.000*	Desire to Learn -> Achievement	0.001*	Content -> Achievement	0.001*	YES	YES	YES	Complementary (Partial Mediation)
Content -> Self-Control	0.004*	Self-Control -> Achievement	0.004*	Content -> Achievement	0.001*	YES	YES	YES	Complementary (Partial Mediation)

Content -> Self-Management	0.000*	Self-Management -> Achievement	0.001*	Content -> Achievement	0.001*	YES	YES	YES	Complementary (Partial Mediation)
Technology -> Desire to Learn	0.006*	Desire to Learn -> Achievement	0.001*	Technology -> Achievement	0.110**	YES	NO	Indirect Only - (Full Mediation)	
Technology -> Self-Control	0.000*	Self-Control -> Achievement	0.004*	Technology -> Achievement	0.110**	YES	NO	Indirect Only - (Full Mediation)	
Technology -> Self-Management	0.000*	Self-Management -> Achievement	0.001*	Technology -> Achievement	0.110**	YES	NO	Indirect Only - (Full Mediation)	

*significant P<0.01, ** not significant P>0.01

Note: P1, P2, and P3 refer to the three steps of mediation analysis, and YES/NO indicates whether the corresponding values are statistically significant. The "Conclusion" column summarizes the type of mediation observed.

In Table 2, the first step in determining the significance of the findings of the PLS bootstrapping test for the relationship P1, i.e., Blended Learning with the mediator Self-Directed Learning, is presented. Next, the significant values for the bootstrapping relationship P2, which consists of Self-Directed Learning with Achievement, are determined. There are 10 significant relationships for P1 and P2, while two relationships are not significant for both P1 and P2. These are the relationships between Teacher to Desire to Learn (0.478) and Desire to Learn to Achievement (0.001), and Teacher to Self-Management (0.215) and Self-Management to Achievement (0.001).

Moving on to the second step, it is ensured that the direct bootstrapping relationship from Blended Learning (exogenous) to Achievement (endogenous) (P3) is significant or not. According to Table 4.31, two relationships are significant: the relationship between Teacher to Achievement (P = 0.001) and Content to Achievement (P = 0.001). Meanwhile, two other constructs do not have significant values, i.e., the direct relationships between the exogenous constructs to the endogenous constructs, namely School to Achievement (0.355) and Technology to Achievement (0.110).

The third step involves determining the mediator results, whether there is full mediation, no mediation, or partial mediation. Since the values for P1 and P2 are not significant in the relationships between Teacher to Desire to Learn and Desire to Learn to Achievement, and the value for P3, i.e., Teacher to Achievement, is significant, the mediation result between Teacher to Desire to Learn to Achievement is no mediation (no mediation). Furthermore, the result of the mediation relationship between Teacher to Self-Management to Achievement is also no mediation. As for constructs with non-significant P3 values, they receive a full mediation result. This includes the constructs School to Desire to Learn to Achievement, School to Self-Control to Achievement, and School to Self-Management to Achievement, which have full mediation. Followed by the constructs Technology to Desire to Learn to Achievement, Technology to Self-Control to Achievement, and Technology to Self-Management to Achievement, which receive the result of full mediation. It can be concluded that the School and Technology constructs from Blended Learning have a full mediation relationship with Self-Directed Learning.

In the third step as well, the researcher needs to ensure that the values of P1, P2, and P3 are positive or not for constructs that have a significant relationship in steps 1 and 2 to determine the type of partial mediation, whether it's complementary or competitive. The results for constructs Teacher to Self-Control to Achievement, Content to Desire to Learn to Achievement, Content to Self-Control to Achievement, and Content to Self-Management to Achievement have positive values for P1, P2, and P3. Thus, they receive the result of complementary mediation with partial mediation.

In Table 4, it is shown that the hypotheses H1-1, H1-2, H1-3, H1-6, H1-8, H1-9, H1-10, H1-11, H1-12, H1-13, H1-14, H1-15, H1-17, H1-18, and H1-19 are supported. Meanwhile, hypotheses H1-4, H1-5, H1-7, and H1-16 are not supported. In general, most of the hypothesized relationships are supported and have a significant impact. The conclusion is that blended learning has a significant relationship among the components of blended learning (School, Teacher, Content, and Technology) and Self-Directed Learning (Self-Management, Desire to Learn, Self-Control) in the academic achievement of students in the subject of Principles of Accounting.

7.0 Discussion and Conclusion

In the rapidly evolving landscape of modern education, particularly in the realm of Accounting Principles instruction, the integration of innovative pedagogical approaches has become paramount. Blended learning, an approach that combines traditional face-to-face instruction with online learning facilitated by computer technology, stands out as a promising strategy. This study underscores the manifold benefits that blended learning, when coupled with self-directed learning and guided pedagogical efforts, can offer in enhancing students' achievement and comprehension of Accounting Principles.

The findings of this study provide empirical support for the efficacy of blended learning within the pedagogy framework as a means to support educators in effectively imparting knowledge in Accounting Principles.

Notably, research by Zikriyah et al., (2022) underscores the positive impact that the integration of self-directed and blended learning components with computer technology can have on student achievement. By integrating self-directed learning strategies, students are afforded opportunities to cultivate self-reliance, while the structured environment of blended learning provides essential guidance.

Moreover, the study's recommendations for future research represent a prudent step towards advancing our understanding and application of computer technology within blended learning across diverse academic disciplines. Such comprehensive endeavors will undoubtedly enrich the learning experiences of students across various domains. Additionally, the emphasis placed on students' and educators' ability to engage in blended learning flexibly underscores the adaptability and accessibility inherent in this approach.

In sum, the blended learning paradigm within the pedagogy framework emerges as a potent tool for educators in delivering effective Accounting Principles instruction. Through enhanced interaction, digital literacy, and opportunities for student creativity, this approach fosters a dynamic and relevant educational milieu in the digital age (Puteri & Mokhtar, 2022). By integrating self-directed learning principles, educators can further fortify the blended learning approach, thereby fostering a more personalized and effective learning environment for Accounting Principles instruction.

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