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Investigating Important Elements That Affect Students' Readiness for and Practical Use of Teaching Methods in Higher Education

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Abstract: In the classroom, blended learning is rising in popularity. The goal of this study was to investigate and assess the factors that affect students' readiness for, perception of behavioral control over, attitudes toward, behavioral intention to use, and actual usage of blended learning in higher education. The researchers therefore set out to develop a novel model for assessing and investigating key factors that affect students' readiness as well as their perceived behavioral control over their use of blended learning in higher education. The study involved 345 undergraduate and graduate students from King Faisal University. In order to analyze the research data, structural equation modeling was used (AMOS-SEM). (a) The students' readiness for and perceived behavioral control of blended learning have a direct positive impact on students' self-efficacy, motivation to learn, learning control, and learning autonomy; (b) The students' readiness for and perceived behavioral control of blended learning have a direct positive impact on students' attitude toward use and students' behavioral intention to use blended learning; and (c) the students' attitude toward blended learning has a direct positive impact on scholastic achievement. A validated instrument was created to examine and look into key factors that influence students' willingness to accept blended learning in Saudi Arabian higher education as a result of the findings.

Keywords: students' readiness; actual use blended learning; higher education; structural equation modeling (SEM)

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1. Introduction

Over time, more and more educational institutions have started to use blended learning. This is because of the straightforward idea of blended learning, which enables multichannel teaching by combining the most effective in-person and online learning opportunities in one easily accessible area. In order to accommodate the various learning preferences of their pupils, teachers can simultaneously present essential information in a variety of ways. In higher education, blended learning is now widely acknowledged as a crucial teaching and learning strategy [1–3].

Access to technology is one of the most significant elements that may affect a student's preparation for blended learning. Due to the increasing use of smart phones among students, it may be assumed that they now have access to both basic and cutting-edge technology [4]. Technology access refers to the availability of technology at school and at home, such as computers and internet connections. Information accessibility is a significant aspect of the quality of online education.

The amount of digital access that a student has impacts their readiness for blended learning since it gives them more freedom over when, where, and how they study. In numerous recent studies, technology availability has been shown to be a major predictor of online learning readiness [5–7]. As a result, the current study indicates that technology availability will impact students' readiness for mixed learning. Another study found

that male students have more self-efficacy in online communication than female students, making them better suited for blended learning [8].

The effectiveness of blended learning is also based on students' capacity to access courses quickly online before attending class, claims [8]. PowerPoint presentations, online video, and audio are all examples of online media that can be used for online learning. Blended learning may be more successful for students who watch or study lecture videos or notes in advance of the class [9]. In order for blended learning to be accepted as part of the teaching and learning process, students must have a positive attitude.

Students' attitudes will be favorable if their beliefs have a beneficial influence. They will have a negative attitude toward mixed learning if their beliefs have bad or unfavorable effects. In a more recent study [10], researchers compared learners' and educators' e-learning readiness and discovered that learners' preparedness is higher than educators. They came to the conclusion that the higher degree of preparation among learners is due to the fact that they are millennials who are digitally savvy.

Educators, on the other hand, are less equipped for e-learning, owing to a lack of technological knowledge, which may be influenced by age and attitude. Blended learning, when done effectively, has the ability to increase student learning outcomes, desire to study, learning control, learning autonomy, and students' preparedness, while also possibly saving money and resources [1,7]. However, the institution should first assess the students' preparedness to ensure that blended learning is implemented successfully. Using a blended learning technique, lecturers can submit instructional materials and convey expertise and information regarding course tasks and other related topics [11]. As a result, scholars, such as Deng et al. [12] and Bokolo Jr. et al. [13], suggested that continuing to examine factors that impact lecturers' adoption of blended learning in isolation without considering how they interact does not improve information technology in education. As a result, it is crucial to evaluate students' self-directed learning, self-efficacy, motivation to learn, learning control, learning autonomy, and readiness to implement blended learning, as well as behavioral control, which influences students' attitudes toward and intentions to use blended learning.

Additionally, while there have been numerous blended learning models for evaluating research students' academic performance throughout the COVID-19 pandemic and their satisfaction with active, collaborative learning and participation in higher education via social media, none exist for evaluating research students' self-directed learning, interaction, motivation to learn, and learning control throughout the COVID-19 pandemic in Saudi Arabian higher education, indicating a gap in the field. The purpose of the study is to analyze and examine the factors that define the relationships between self-directed learning, self-efficacy, motivation to learn, control over learning, learning autonomy, readiness, perceived behavioral control, attitude toward use, behavioral intention to use, and actual use of blended learning using the TAM model.

According to the researcher's major study question, what are the perceptual features that influence students' readiness, perceived behavioral control, attitude toward use, behavioral intention to use, and actual use of blended learning? Thus, the goal of this study is to develop a model of investigating important elements that affect students' readiness for and practical use of teaching methods in higher education during the COVID-19 pandemic in higher education institutions, as well as validating the technology acceptance model (TAM) for students' readiness, perceived behavioral control, attitude toward use, and behavioral intention to use blended learning, in turn, affecting the actual use of blended learning. Therefore, in order to evaluate if behavioral control and attitude affected behavioral intention to use blended learning, the goal of this study was to create a novel model for evaluating blended learning readiness qualities. Through a questionnaire survey of an undergraduate student at King Faisal University in Saudi Arabia, the concept was assessed for preparedness for blended learning.

2. Literature Review and Research Model Hypotheses

Blended learning, which combines different instructional modalities, is one of the developing learning scenarios. This is a teaching–learning strategy, according to Serrate-González et al. [14] and Durán et al. [15], that combines in-person instruction with online learning to maximize the advantages of both [14]. This model combines two learning environments: face-to-face instruction, which has a long history at KFU, and virtual instruction, which is gaining popularity as a way to offer and extend new avenues in self-directed learning, interaction and motivation to learn, and learning control [14,16]. This study looked at important factors, such as self-directed learning, self-efficacy, motivation to learn, control over learning, learning autonomy, readiness, perceived behavioral control, attitude toward use, behavioral intention to use, and actual use, that influence students' actual use of blended learning in higher education (see Figure 1).

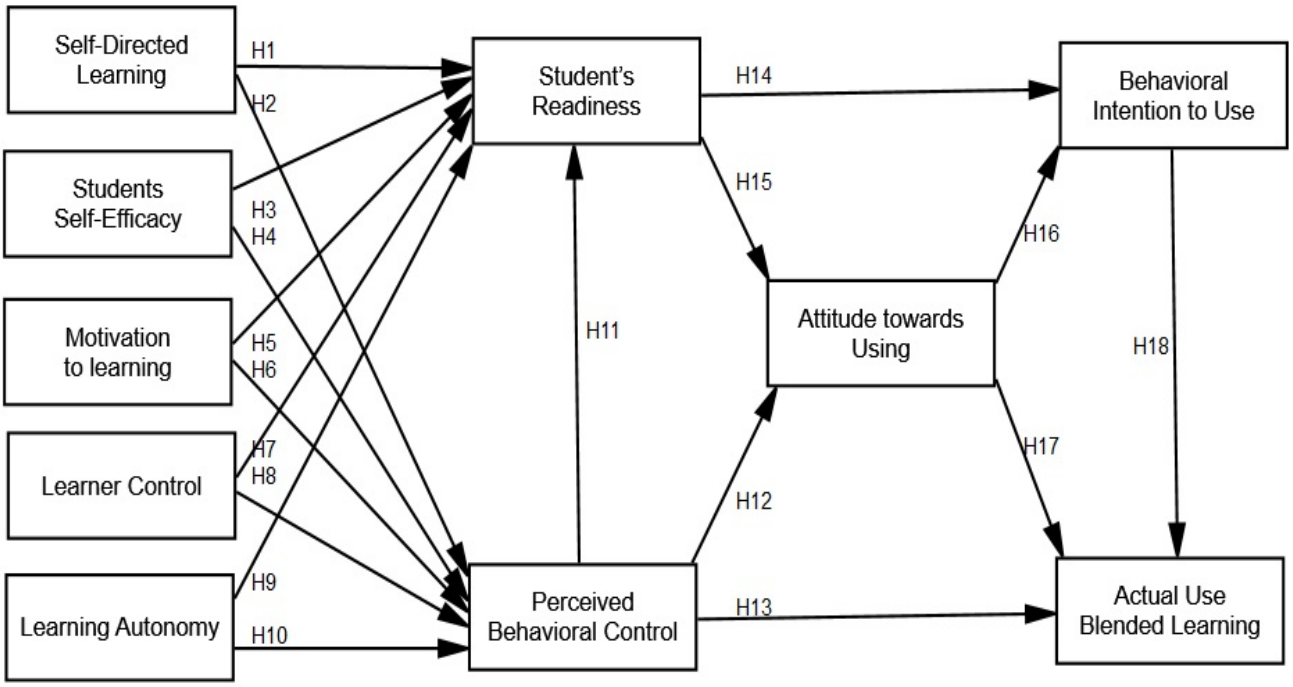


Figure 1. Research model with hypotheses. **H1:** *SDL is positive with SR.* **H2:** *SDL is positive with PBC.* **H3:** *SSE is positive with SR.* **H4:** *SSE is positive with PBC.* **H5:** *ML is positive with SR.* **H6:** *ML is positive with PBC.* **H7:** *LC is positive with SR.* **H8:** *LC is positive with PBC.* **H9:** *LA is positive with SR.* **H10:** *LA is positive with PBC.* **H11:** *PBC is positive with SR.* **H12:** *PBC is positive with AT.* **H13:** *PBC is positive with AUBL.* **H14:** *SR is positive with BIU.* **H15:** *SR is positive with AR.* **H16:** *AT is positive with BIU.* **H17:** *AT is positive with AUBL.* **H18:** *BIU is positive with AUBL.*

2.1. Self-Directed Learning (SDL)

The autonomy of the learner defines the form of education known as self-directed learning [17]. It has been suggested that preparing students for self-directed learning involves developing the attitudes and skills necessary for it. In self-directed learning (SDL), the learner assumes ownership and control over their own education. Individuals choose, manage, and evaluate their own educational activities at any age, in any location, using any method. "A process in which people diagnose their own learning needs, formulate learning goals, identify human and material resources for learning, select and apply appropriate learning techniques, and evaluate learning outcomes on their own, with or without assistance from others", is how self-directed learning is defined [18]. Self-directed learning gradually transfers authority from the teacher to the pupil, allowing students more control over their learning objectives and the best way to finish a job. Self-directed learning emphasizes the significance of learners' motivation and desire from the beginning to the end of

their efforts to achieve their goals [19]. The following hypotheses were suggested based on the discussion above:

H1: *SDL is positive with SR.*

H2: *SDL is positive with PBC.*

2.2. Students' Self-Efficacy (SSE)

Due to its function in correct conduct, self-efficacy is an essential psychological component that has been regarded as relevant in numerous fields of psychology due to its function. In reality, increasing self-efficacy and identifying influencing factors will have an impact on student accomplishment. Self-efficacy is the ability to handle the obstacles of life. The extent or strength of one's confidence in their own capacity to complete activities and reach objectives is known as self-efficacy [20]. Self-efficacy, according to Bandura [21], is the conviction that one can succeed in particular circumstances or complete a task. The way one tackles objectives, jobs, and problems depends on how self-sufficient they feel [22]. Self-efficacy has the potential to either positively or negatively affect motivation. Self-efficacious individuals are more eager to try out novel activities [23]. When faced with challenges, those with high self-efficacy overcome obstacles and succeed, in contrast to those with low self-efficacy who give up. Learners who have a high sense of their own abilities are more persistent and driven to succeed. In comparison to those who have poor self-efficacy, they exert more effort [24]. While people with strong self-efficacy might not prepare as well, those with low self-efficacy could feel compelled to learn more about a new subject. The following hypotheses were suggested based on the discussion above:

H3: *SSE is positive with SR.*

H4: *SSE is positive with PBC.*

2.3. Motivation to Learning (ML)

Academic motivation is a kind of reflective motivation, which is described as the "need" to succeed or be competent in coping with one's surroundings [25]. Karami et al. [26] conducted a survey that revealed that, with cognitive and metacognitive techniques, creativity, motivation, and academic self-concept will improve. Motivation is one of the most prominent elements linked to self-efficacy in research writing. Extrinsic and intrinsic motivation are frequently used to categorize motivation. The motivation for the activity might be anything from a lack of motivation to passive acquiescence to active personal commitment.

According to self-determination theory (SDT), these diverse justifications indicate differing degrees of internalization and integration of the desired behavior's value and regulation. Students' Academic Motivation People's "taking in" of a notion is referred to as internalization [27]. In their study, Deci and Ryan [28] adopted a very precise idea of intrinsic motivation. Motivation has a number of effects on how students learn and act with regard to subject matter in education [20].

Students may require contextual motivation, which is given in the teacher-created situation, because they are not necessarily internally motivated. Motivation may be described as an individual's driving factor behind all of their actions. Individuals will satisfy their desires in a variety of ways and are motivated to achieve for a variety of internal and external reasons [29]. Achievement behavior, according to motivational researchers, is a relationship between environmental conditions and the individual subject's drive to accomplish something. Implicit and explicit intentions are both directly involved in behavior prediction. The following hypotheses were suggested based on the discussion above:

H5: *ML is positive with SR.*

H6: *ML is positive with PBC.*

2.4. Learner Control (LC)

According to the notion of learner control [30], learners will benefit if they are given more control over the pace or nature of their training. Student control is the process of giving each individual learner the freedom to choose their own learning examples, create their own learning assignments in order, practice, and plan their learning sessions accordingly [31]. The importance of learner control has been discussed by several academics [31,32]. At every level of the learning process, active participation and learner control are necessary, according to educators [33]. As a result, pupils are better able to understand learning processes and how to adjust to a variety of learning content in a dynamic environment [31]. Therefore, in order for students to respond favorably to the program and boost their participation in the learning activity itself, online learning must be planned and conducted in accordance with their preferences [34]. The following hypotheses were suggested based on the discussion above:

H7: *LC is positive with SR.*

H8: *LC is positive with PBC.*

2.5. Learning Autonomy (LA)

Learning autonomy refers to learning outside of the classroom, or when students are in charge of their own learning [35]. Furthermore, the student has complete control over his or her learning [36]. With that said, in research analyzing learners' independent actions in online settings, it has been usual to use the conventional definition and notion of learning autonomy [37]. In both teaching and learning, autonomy has been a favored alternative. Due to the prevalence of globalizing technology, it has definitely become an essential and de facto part of education. Because of their familiarity with the internet, today's learners are expected to take care of their learning [38].

In the field of education research, learning autonomy and online learning have become inseparable fields; as a result, they are always examined jointly. The proliferation of technological educational tools and platforms is thought to have boosted learning independence [39], which is the essence of learner autonomy. Simultaneously, technology's undeniable dominance over education has prompted the development of a set of abilities that learners should possess, all of which are based on autonomy and self-learning. Learning autonomy has long been considered a western concept imposed on non-western educational environments [40,41]. Furthermore, according to [35], active and autonomous engagement of learners in their own learning, also known as learning autonomy, enhances the desire to study and, as a result, learning effectiveness. Learner choice, learner freedom, and learner accountability are all characteristics of motivation, according to the researchers. Furthermore, according to [42], independent learners are motivated learners by definition. The following hypotheses were suggested based on the discussion above:

H9: *LA is positive with SR.*

H10: *LA is positive with PBC.*

2.6. Students' Readiness (SR)

Understanding students' preparation for autonomy not only informs curriculum development, classroom practice, and teacher training [43], but it also gives "an opportunity to move away from a culturist vision of learner autonomy" [44]. For blended learning to be successfully implemented, student readiness is essential [45]. To identify preparation, educators may evaluate students' knowledge [46], technical aptitude and access [45], self-

directed learning [47], computer and internet efficacy [48], and attitude [46]. The following hypotheses were suggested based on the discussion above:

H11: *SR is positive with BIU.*

H12: *SR is positive with AR.*

2.7. Perceived Behavioral Control (PBC)

Numerous studies [49,50] have found a link between generally positive self-efficacy and the implementation of change and mastery of problems when it comes to perceived behavioral control (or self-efficacy beliefs). Teachers that have a higher level of self-efficacy prepare more difficult lessons while also being more ready to modify their teachings to their students' skills. With regard to instructors' self-efficacy, a tight relationship between diagnostic competencies and didactic interventions has been established in research on adaptive teaching competencies [51]. Although behavioral intention mediates the effects of attitudes on specific behaviors [52], Ajzen [53] claimed that perceived behavioral control influences behavior both directly and indirectly via behavioral intention. The following hypotheses were suggested based on the discussion above:

H13: *PBC is positive with SR.*

H14: *PBC is positive with AT.*

H15: *PBC is positive with AUBL.*

2.8. Students Attitudes toward Blended Learning (AT)

The challenges of technological accessibility must be addressed since blended learning requires students' access to both hardware and software [7]. Individual views about blended learning may be influenced by pupils who do not have equal access to and support from technology as their classmates [32]. Similarly, the attitude was influenced by the difficulties of obtaining a high-speed internet connection and the employment of outmoded technologies [54]. As a result, students who have access to knowledge through technology will have a more favorable attitude toward blended learning than students who do not. The following hypotheses were suggested based on the discussion above:

H16: *AT is positive with BIU.*

H17: *AT is positive with AUBL.*

2.9. Behavioral Intention to Use Blended Learning (BIU)

The extent to which an individual has declared conscious plans to execute or not execute a certain future activity is referred to as "behavioral intention" [55]. The motivating elements that influence lecturers' behavior toward blended learning are thought to be captured by intentions [56]. The goal of this study is to see if professors are excited about implementing blended learning initiatives for educational reasons [57]. Furthermore, as a result of a previous study, there has been a growing interest in evaluating the influence of continuous e-learning system usage intention [58,59]. Similarly, lecturers' usage behavior is related to the frequency with which they use blended learning. It refers to how frequently lecturers use integrated learning to enhance classroom activities [55]. As a result, usage behavior relates to how people use technology over time [60]. Lecturers' intentions to continue using blended learning approaches for course design in a mixed learning environment are determined by their belief that blended learning may improve teaching and learning quality [61]. The following hypotheses were suggested based on the discussion above:

H18: *BIU is positive with AUBL.*

2.10. Actual Use Blended Learning (AUBL)

Blended learning approaches have been employed by a growing number of academic institutions throughout the world over the last few years [62]. According to research [63], blended learning is expected to become the future educational model for higher education course delivery. Although blended learning as a pedagogical strategy is still relatively young, increasing acceptance of digital technologies for educational purposes has hastened its development [64]. Blended learning is essentially the use of pedagogical strategies that enable students with various learning styles to integrate conventional face-to-face and online instruction [65]. Blended learning is a teaching method that allows lecturers to teach while students study at their own pace in a collaborative and interactive environment [66]. Students become involved and active learners in blended learning, which involves a fundamental shift in educational style from lecture-centered to student-centered learning [67]. Furthermore, blended learning refers to a combination of several instructional methodologies used with and without the use of technology to increase student learning outcomes [67].

3. Research Methodology

The primary method of research for this study was a research survey that used structured questionnaire techniques. Because the researcher wants to quantify the variables, both study designs are suitable [68,69]. In this proposed conceptual framework, the researchers intend to investigate the mediator impact among the relevant variables. They employed structural equation modeling theory with (AMOS-SEM) as a statistical approach [70]. Skewness and kurtosis statistics were utilized to investigate the data distribution as well as the presence of outliers. Because both skewness and kurtosis values are in the region of 1.00, the data may be deemed fairly normal with no severe outliers [70]. Although the free data distribution assumption of the AMOS-SEM theory is made [70], this procedure is necessary because bootstrapping was used to calculate the standard error of the parameter, and extremely non-normal data distribution can result in ambiguous estimates of the standard error of the parameter [70].

3.1. Data Gathering, Data Analysis, and Sampling

Sampling is the process of choosing a group of individuals from a population to represent the entire community in a study [71]. The study distributed 345 university students from King Faisal University in Saudi Arabia, and because the researcher used a survey data-gathering approach, these students answered all of the questions completely. Basically, there are six independent factors, two mediator variables, and two dependent variables in this study's conceptual framework. All of the indicators used to measure these six factors were modified from the previous study, which employed 36 indicators; see Table 1 and Figure 2. Table 2 contains a list of the questionnaire's elements (model fit) and related items. The survey was carried out online, and the results were analyzed using SPSS 22.0 and Amos 23.0. The links between the major factors influencing students' behavior in blended learning in higher education were examined using structural equation modeling. Each question consists of a statement that the respondent must rate from 1 to 5 according to how strongly they agree or disagree with it (1 = strongly agree, 2 = agree, 3 = neither agree nor disagree, 4 = disagree, and 5 = strongly disagree).

Table 1. Data on population.

	Factors	Frequency	Percent		Factors	Frequency	Percent
Gender	Male	228	66.1	Level of study	Undergraduate	213	61.7
	Female	117	33.9		Postgraduate	132	38.3
	Total	345	100.0		Total	345	100.0
Age	17–22	41	11.9	Faculty	Education	101	29.3
	23–27	213	61.7		Art	97	28.1
	28–30	29	8.4		Law	80	23.2
	31–34	33	9.6		Management	67	19.4
	>35	29	8.4		Total	345	100.0
	Total	345	100.0				

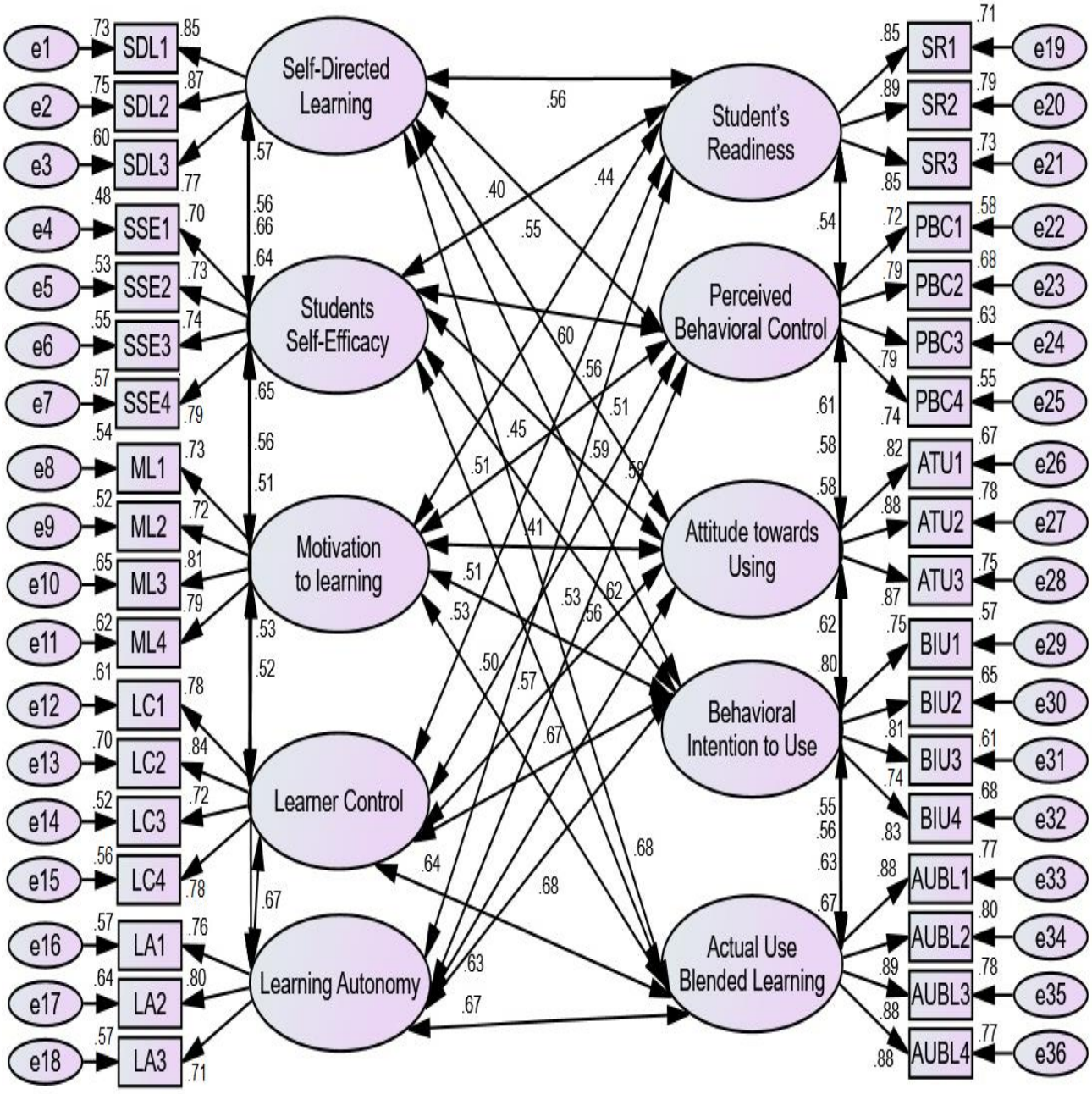


Figure 2. Measurement model. e1–e36 represent the items of factors.

Table 2. The reliability coefficient for all variables.

Factors	Code	Pilot Test	Final Test
Self-Directed Learning	SDL	0.771	0.899
Students Self-Efficacy	SSE	0.809	0.941
Motivation to learning	ML	0.821	0.911
Learner Control	LC	0.779	0.908
Learning Autonomy	LA	0.805	0.879
Student's Readiness	SR	0.795	0.900
Perceived Behavioral Control	PBC	0.759	0.913
Attitude towards Using	AT	0.811	0.901
Behavioral Intention to Use	BIU	0.802	0.918
Actual Use Blended Learning	AUBL	0.798	0.916

3.2. Instruments and Measurement Model

As shown in Table 3, a survey instrument was utilized to conduct a thorough analysis and achieve the objectives of the study. There were 10 variables and 36 indicators. Learning control was modified to three items as recommended by [31], learning autonomy was modified to three items as recommended by [37], students' readiness was modified to three items as recommended by [45], students' self-directed learning was modified to three items as recommended by [17], students' self-efficacy was modified to four items as recommended by [20], motivation to learn was modified to four items as recommended by [25], behavioral intention to use was modified to four items as advised by [55], perceived behavioral control was modified to four items as recommended by [49], and actual usage of blended learning was modified to four items as recommended by [62].

Table 3. Model fit evaluation.

Model Fit	NFI	RFI	IFI	TLI	CFI	GFI	AGFI	RMR	CMN/DF
Default model	0.933	0.924	0.951	0.943	0.951	0.919	0.901	0.035	3.014
Saturated model	1.000		1.000		1.000	1.000		0.000	0.000
Independence model	0.000	0.000	0.000	0.000	0.000	0.158	0.110	0.326	0.000

4. Analysis of Data and Findings

The empirical analysis of the current study attempts to see the interrelationships of numerous independent and dependent factors related to students' readiness, perceived behavioral control, attitude toward use, behavioral intention to use, and actual use of blended learning.

For a variety of reasons, structural equation modeling (SEM) was the statistical technique used in the data analysis. Researchers have long debated whether a two-step or one-step process is preferable when using the SEM. The authorized responses are entered into the SPSS program for analysis. Coding and data processing are needed for this. The data for this inquiry are coded using the SPSS application. Data coding is the process of applying character symbols, mostly numerical symbols, to data. Before being entered into SPSS and Smart PLS-SEM, the data are changed to ensure their acceptance.

The demographic information is shown in Table 1. In total, 228 (66.1%) of the 345 usable questionnaires were from male respondents, while 177 (33.9%) came from female respondents. In addition, 41 (11.9%) were between the ages of 17 and 22, 213 (61.7%) between the ages of 23 and 27, 29 (8.4%) between the ages of 28 and 30, 33 (9.6%) between the ages of 31 and 34, and 29 (8.4%) or older. Additionally, 132 (38.3%) of the students were postgraduates, while 213 (61.7%) were undergraduates. Last but not least, according to Table 1, 101 (29.3%) of the faculties were from the faculty of education, 97 (28.1%) from the faculty of art, 80 (23.2%) from the faculty of law, and 67 (19.4%) from the faculty of management.

4.1. Structured Equation Modelling

As suggested by [72] for test construction, the item difficulty, reliability, and item discrimination calculations were used to determine the psychometric properties of the scales in the first step. In this study, all values greater than 0.8 indicate a high level of factor acceptance, as shown in Table 2. In order to ensure that the scales are meaningful, all variables underwent additional analysis using Cronbach's alpha, as demonstrated in [70].

4.2. Model Fit Evaluation

Table 3 shows a CMN/DF ratio of 3.014, which is below the required level (5.00). The RMR value is under the 0.35 cutoff (0.05). According to [70], the following values are valid: AGFI (0.901), GFI (0.951), CFI (0.951), TLI (0.943), IFI (0.951), RFI (0.924), and NFI (0.933). All elements and their influence are displayed in Figure 2. This demonstrates that the measurement model was suitable for the structural model and that it was acceptable for all indicators "e1–e36". See Figure 2 and Table 3.

4.3. Model for Reliability, Validity, and Measuring

In the context of Likert scale items, item difficulty relates to an item's typical level of acceptance and rejection. This was calculated by dividing the mean value of the item by the maximum value of the rating scale. In this study, all values over 0.7 point to high item acceptance, while values below 0.2 point to high item rejection [73]. Each idea's SEM-AMOS measurement model has a unique collection of traits, including reliability and validity. Model fit and confirmatory factor analysis (CFA) were used to analyze the structural model's link direction's intensity. The measuring factors are listed in Table 3. The factors analysis items meet the required 0.700 level and above, the factors analysis composite reliability (CR) meets the required 0.800 level and above, the factors analysis average variance extracted (AVE) meets the required 0.500 level and above, and the factors analysis Cronbach's alpha (CA) meets the required 0.800 level and above. The results are displayed in Table 4 as follows: total item arrangement from (0.893 to 0.702), composite reliability from (0.913 to 0.901), Cronbach's alpha from (0.937 to 0.889), and average variance taken from (0.692 to 0.592).

Table 4. Shows the model of reliability, validity, and measurement. "<—" represent relationship between items in factor.

No.	Items		Factors	Estimate	CA	AVE	CR
1	SDL1	<—	Self-Directed Learning	0.853	0.899	0.610	0.900
2	SDL2	<—		0.866			
3	SDL3	<—		0.772			
4	SSE1	<—	Students Self-Efficacy	0.702	0.941	0.661	0.922
5	SSE2	<—		0.728			
6	SSE3	<—		0.740			
7	SSE4	<—		0.783			
8	ML1	<—	Motivation to Learn	0.732	0.911	0.679	0.895
9	ML2	<—		0.722			
10	ML3	<—		0.806			
11	ML4	<—		0.790			
12	LC1	<—	Learner Control	0.781	0.908	0.669	0.931
13	LC2	<—		0.837			
14	LC3	<—		0.724			
15	LC4	<—		0.784			

Table 4. *Cont.*

No.	Items	Factors		Estimate	CA	AVE	CR
16	LA1	<—	Learning Autonomy	0.757	0.879	0.592	0.893
17	LA2	<—		0.799			
18	LA3	<—		0.712			
19	SR1	<—	Student's Readiness	0.852	0.900	0.692	0.906
20	SR2	<—		0.890			
21	SR3	<—		0.845			
22	PBC1	<—	Perceived Behavioral Control	0.722	0.913	0.688	0.937
23	PBC2	<—		0.792			
24	PBC3	<—		0.793			
25	PBC4	<—		0.740			
26	AT1	<—	Attitude toward Using	0.819	0.901	0.597	0.889
27	AT2	<—		0.880			
28	AT3	<—		0.868			
29	BIU1	<—	Behavioral Intention to Use	0.753	0.918	0.677	0.921
30	BIU2	<—		0.806			
31	BIU3	<—		0.741			
32	BIU4	<—		0.827			
33	AUBL 1	<—	Actual Use Blended Learning	0.877	0.916	0.682	0.909
34	AUBL2	<—		0.893			
35	AUBL3	<—		0.885			
36	AUBL4	<—		0.879			

4.4. Convergent Measurement Validity

Discriminant validity refers to the degree of divergence between the sets of variables and their own indicators. Correlations between items in two variables should not be greater than the square root of the mean variance shared by the items in one variable, according to Hair et al. [70]. The AVE value should also be better than 0.50 for any variables with a 50% variance [74]. The similarities between items in the two constructions should be greater than the square root shared by objects in a single construct. The results were approved and are arranged in Table 5 from (0.903 to 0.816).

Table 5. Validity of discrimination.

Factors	SDL	SEE	ML	LC	LA	SR	PBC	AT	BIU	AUBL
Self-Directed Learning	0.863									
Students Self-Efficacy	0.351	0.855								
Motivation to Learn	0.342	0.270	00.888							
Learner Control	0.350	0.267	00.342	0.840						
Learning Autonomy	0.252	0.260	00.279	0.281	0.898					
Student's Readiness	0.445	0.297	0.329	0.326	0.254	0.816				
Perceived Behavioral Control	0.377	0.282	0.330	0.328	0.272	0.335	0.883			
Attitude toward Using	0.394	0.308	0.367	0.376	0.282	0.355	0.358	0.903		
Behavioral Intention to Use	0.347	0.282	0.333	0.322	0.285	0.303	0.326	0.357	0.822	
Actual Use Blended Learning	0.508	0.373	0.331	0.313	0.215	0.388	0.345	0.363	0.309	0.841

4.5. Structural Model Evaluation

The structural model is put to the test in this second step to see if it supports the relationships between the variables [75]. As a result, the model hypotheses shown in Figures 3 and 4 are assessed using the AMOS method, which uses bootstrap resampling to look at the path significance levels of each hypothesis. The results of the hypothesis testing are shown in Table 6, where each hypothesis' statistical significance was determined using a two-tail test (0.000). Additionally, when $p = 0.05$, the path coefficient value estimate (0.000), which gauges the strength of the correlation between variables (p value), becomes significant. In Figure 3, an illustration is shown.

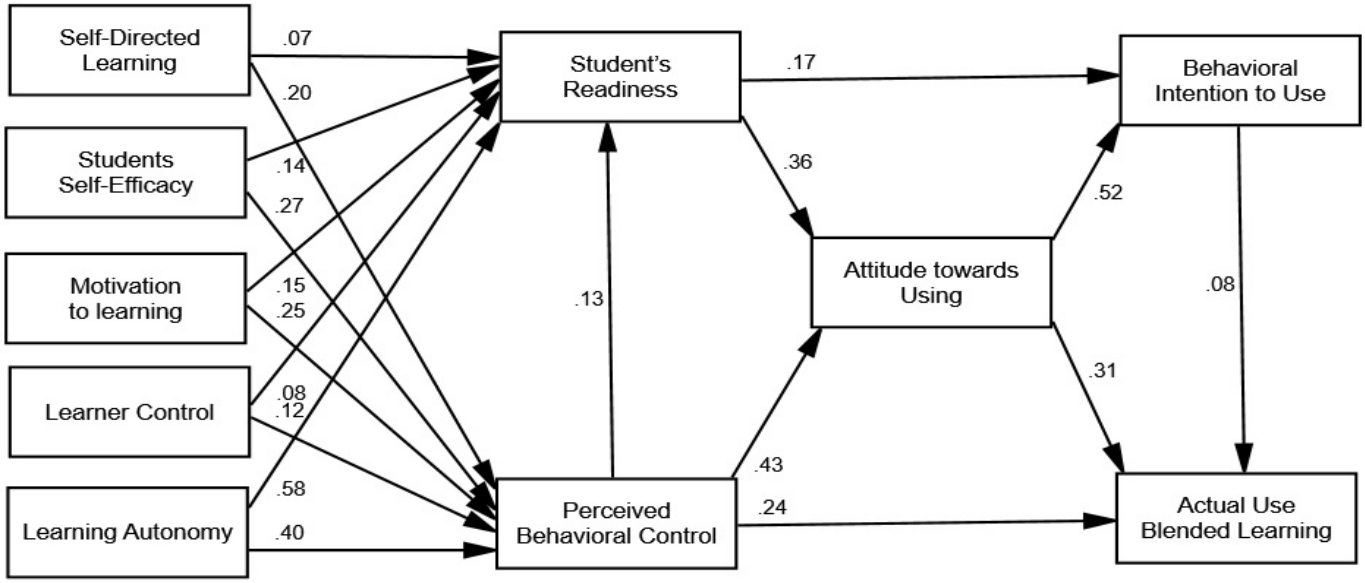


Figure 3. Path Coefficient Results.

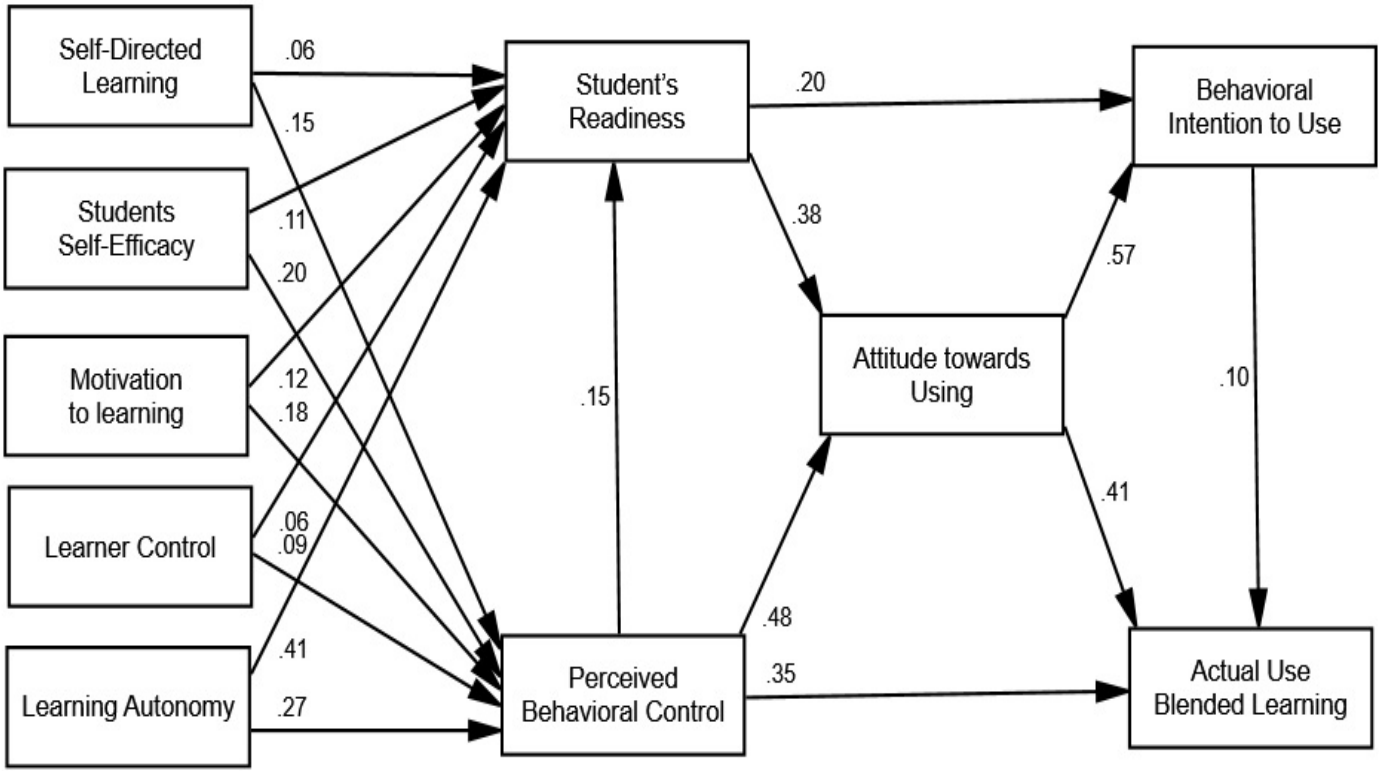


Figure 4. Results of the path T-values.

Table 6. Testing of hypotheses. "<—" represent relationship between items in factor.

No.	Relationships			Estimate (β)	SE	CR	*p*	Results
H1	AT	<—	SDL	0.062	0.020	20.957	0.003	Accepted
H2	PBC	<—	SDL	0.154	0.022	60.461	0.000	Accepted
H3	AT	<—	SSE	0.113	0.021	110.880	0.000	Accepted
H4	PBC	<—	SSE	0.202	0.024	70.561	0.000	Accepted
H5	AT	<—	ML	0.124	0.019	80.465	0.000	Accepted
H6	PBC	<—	ML	0.118	0.022	70.135	0.000	Accepted
H7	AT	<—	LC	0.064	0.019	40.762	0.000	Accepted
H8	PBC	<—	LC	0.094	0.021	30.478	0.000	Accepted
H9	AT	<—	LA	0.413	0.022	50.375	0.000	Accepted
H10	PBC	<—	LA	0.274	0.024	80.154	0.000	Accepted
H11	AT	<—	SR	0.154	0.025	40.351	0.000	Accepted
H12	PBC	<—	SR	0.482	0.028	50.497	0.000	Accepted
H13	AT	<—	PBC	0.347	0.024	80.399	0.000	Accepted
H14	BIU	<—	PBC	0.380	0.029	110.018	0.000	Accepted
H15	AU	<—	PBC	0.204	0.040	80.624	0.000	Accepted
H16	BIU	<—	AT	0.574	0.028	170.234	0.000	Accepted
H17	AU	<—	AT	0.412	0.042	90.701	0.000	Accepted
H18	AU	<—	BIU	0.104	0.037	20.626	0.009	Accepted

4.6. Results of Testing Hypotheses

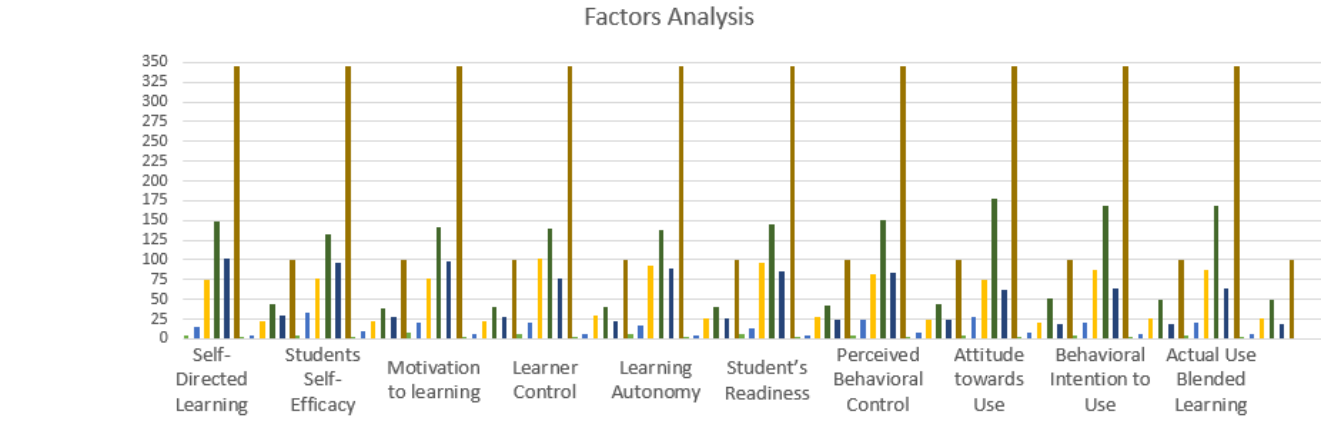
Both the association between self-directed learning and perceived behavioral control (β = 0.154; C.R = 6.461) and the relationship between self-directed learning and students' readiness (β = 0.062; C.R = 2.957) were found to be valid based on the results in Table 6 and Figure 4. The association between students' self-efficacy and perceived behavioral control (β = 0.202; C.R = 7.561) and the relationship between students' self-efficacy and readiness (β = 0.113; C.R = 11.880) were also validated. Additionally, the correlation between learning motivation and students' readiness (β = 0.124; C.R = 8.465) and between learning motivation and perceived behavioral control (β = 0.118; C.R = 7.135) was confirmed. Moreover, the correlation between learning control and perceived behavioral control (β = 0.094; C.R = 3.478) and the correlation between learning control and students' readiness (β = 0.064; C.R = 4.762) were both acceptable. Furthermore, the correlation between learning autonomy and perceived behavioral control (β = 0.274; C.R = 8.154) and the correlation between learning autonomy and students' readiness (β = 0.413; C.R = 5.375) were both acceptable. Additionally, it was accepted that there was a relationship between perceived behavioral control and students' readiness (β = 0.154; C.R = 8.399) and attitude toward usage (β = 0.482; C.R = 11.018), as well as the correlation between actual application of blended learning and perceived behavioral control (β = 0.347; C.R = 8.624 was accepted), similar to how it was agreed that there was a relationship between students' readiness and attitude toward use (β = 0.380; C.R = 4.351). Also taken into consideration was the connection between students' readiness and their behavioral intention to use (β = 0.204; C.R = 5.497). Additionally, it was confirmed that there is a relationship between attitude toward use and behavioral intention to use (β = 0.574; C.R = 17.234). The correlation between attitudes about using blended learning and its actual use (β = 0.412; C.R = 9.701 was confirmed). The link between behavioral intention to use blended learning and actual use was accepted (β = 0.104; C.R = 2.626).

5. Described and Analyzed Factors

Two statistics that indicate how measurements in a population differ from the average (mean) or expected value are the standard deviation (SD) and mean (mean).

Once the standard deviation is low, the majority of the data points are close to the mean. If the standard deviation is large, the data are more uniformly distributed. As a result, all values were accepted, and the majority were strongly agreed upon, as shown in Figure 5. This shows that the key factors influencing students' actual use of blended

learning in higher education through self-directed learning, such as students' self-efficacy, motivation to learn, learning control, learning autonomy, students' readiness, perceived behavioral control, students' attitude toward use, behavioral intention to use, and actual use of blended learning.



	Self-Directed Learning		Students Self-Efficacy		Motivation to learning		Learner Control		Learning Autonomy		Student's Readiness		Perceived Behavioral Control		Attitude towards Use		Behavioral Intention to Use		Actual Use Blended Learning	
Strongly Disagree	4	1.2	5	1.4	8	2.3	6	1.7	7	2.0	6	1.7	5	1.4	4	1.2	5	1.4	5	1.4
Disagree	16	4.6	33	9.6	20	5.8	21	6.1	17	4.9	13	3.8	25	7.2	27	7.8	21	6.1	21	6.1
Neutral	75	21.7	77	22.3	77	22.3	102	29.6	93	27.0	96	27.8	82	23.8	74	21.4	87	25.2	87	25.2
Agree	149	43.2	133	38.6	141	40.9	140	40.6	138	40.0	145	42.0	150	43.5	178	51.6	168	48.7	168	48.7
Strongly Agree	101	29.3	97	28.1	99	28.7	76	22.0	90	26.1	85	24.6	83	24.1	62	18.0	64	18.6	64	18.6
Total	345	100.0	345	100.0	345	100.0	345	100.0	345	100.0	345	100.0	345	100.0	345	100.0	345	100.0	345	100.0

Figure 5. Described and analyzed factors.

5.1. Discussion and Relevance

This study's objectives were to determine whether students were ready for a mixed-gender classroom and to rate their preparedness according to their gender, age, academic standing, and field of study. First off, the results of this study showed that college students have the necessary technical abilities and are generally prepared to take part in a blended learning style of training. Adams et al. [76] study in a public higher education institution led to the same finding. Given that these students are in their twenties, have grown up in a technologically driven society and are accustomed to and demand relevant, engaging, and interactive learning experiences, the findings are not surprising. Shraim and Khlaif [77] claimed that 75% of the students in their study lacked ICT and learning-based system competencies due to a lack of exposure and experience. To avoid failure while using e-learning and blended learning for the efficacy of learning, expertise in the use of a learning management system is necessary [78–80]. Based on these results, the study came to the conclusion that if students' self-directed learning, self-efficacy, willingness to learn, control over their learning, and autonomy were raised, so would their readiness and perceived behavioral control. Besides that, the average levels of students' readiness and perceived behavioral control and students' attitude toward utilizing blended learning, as well as the rate of students' behavioral intention to utilize and actual usage of blended learning, were all raised. Moreover, this research was able to use the blended learning model as a supplement to the current adoption assessment model as a result of this study. This may be a component of a more comprehensive blended learning strategy that takes into account each students' unique learning needs and effectiveness. The most important question is how institutions of higher learning are implementing blended learning as a novel idea in transition to replace conventional face-to-face classrooms, taking into account practical factors that contribute to successful implementation and whether the model's application outcomes in a new learning curve for students. Because of this, a blended learning environment's features encourage students to seek information and assistance from a variety of sources, to apply what they've learned, and to gain confidence in doing so in a real-world setting. Students have trouble using the learning management system and

e-mail when it comes to technology. Although students do not frequently use these two tools, they are crucial to blended learning. Students chose instant messaging software and mobile technology as their preferred blended learning methods in this study as a result. Most students already have the necessary computer hardware, including laptops or PCs, as well as internet access, to participate in blended learning. If they have online access to course materials, students prefer hybrid classrooms to traditional ones [81]. Students must have access to digital resources including software, tools, and the internet in order to be interested in participating in the blended learning paradigm. This assertion was supported by Al-rahmi et al. [82], who discovered that internet access, computer and software hardware, and other obstacles hindered the adoption of blended learning in underdeveloped nations.

Institutions should therefore make extensive efforts to assist students in becoming more digitally adept [76]. Self-directed learning was evaluated as demanding by learners. This result is consistent with another study's findings, according to which students regarded self-directed learning as average [45]. In contrast to Al-Rahmi et al. [83] who defined blended learning as a process in which students attempt to do the same, self-directed learning was defined by [84] as a process in which students strive to organize, manage, and direct their online learning activities with their lecturers. Students still favor guided traditional face-to-face lectures over a hybrid learning approach to education as a consequence of this research. The growth of self-directed learners depends heavily on lecturers. Instructors must make sure that students are capable of learning independently because the majority of participants in foundation and diploma programs are pre-university students. Before they can start studying independently, students must be guided by what they need to learn and where they may locate the necessary materials.

The study also discovered that communicating on the university's learning management system and having the courage to post questions on online discussion boards are the most difficult aspects of the procedure. Students' readiness, perceived behavioral control, and attitude toward usage, as well as their self-efficacy, drive to learn, learning control, and learning autonomy, all have an impact on how they will use blended learning in the future. The findings of the study on students' attitudes toward blended learning show that there is a generally favorable attitude among students in the institution. Students, on the other hand, have a poor opinion of blended learning, per the research [85]. Given that undergraduate students make up the majority of the study's participants, it is safe to presume that they are already familiar with blended learning technologies, their usability, and how to use them effectively. Because they are crucial components of learning motivation, control, and autonomy, students' perceptions of blended learning may affect their choice to continue online learning [86,87]. The finding shows that almost 91.6% of the students were positive and satisfied with the implementation of actual blended learning. By applying blended learning, students were also permitted to repeat or reopen the lesson without any pressure. The second higher percentage is the belief that blended learning can improve students' skills or understanding; the results are displayed in Table 4 as follows: composite reliability measures students' readiness (90%), perceived behavioral control (91%), and attitude toward using blended learning (90%).

According to [88], there are five challenges to transitioning to online education experienced by higher education institutions: synchronous and asynchronous learning tool integration, access to technology, faculty and student online competence, academic dishonesty, and privacy and confidentiality. Furthermore, during the COVID-19 pandemic, online learning has mediated the relationship between student interactivity and satisfaction [89]. Moreover, in [90], an analysis is conducted of a systematic literature review that seeks to explore the transition, in the context of the pandemic, from traditional education that involves face-to-face interaction in physical classrooms to online distance education. Thus, the systematic review's implications highlight the need to rebuild efforts to focus on the Sustainable Development Goals, especially given the evolving higher education landscape during the COVID-19 pandemic [91]. Additionally, according to [92], harm was described

in the context of organizational aspects of modern scientific processes (educational technologies), which cause normative dissonance for academics and a decline in trust in science both inside the research field and in the relationship between science and society.

Several research findings (see Figure 4 and Table 6) concern students' self-directed learning, students' self-efficacy, motivation to learn, learning control, learning autonomy, students' preparedness, students' perceived behavioral control, students' attitude toward using blended learning, students' behavioral intention to use it, and students' actual usage of it. This study illustrates how prepared students are to enhance their blended learning. A validated tool has also been created as a result of our research to evaluate students' preparation for and actual use of blended learning in higher education. The scientific contributions are as follows, in order:

- In relation to the independent factor hypotheses on the actual application of blended learning in higher education, it was discovered that students' readiness and perception of behavioral control were influenced by self-directed learning, students' self-efficacy, motivation to learn, learning control, and learning autonomy.
- In relation to the mediators' assumptions on the actual application of blended learning in higher education, it was discovered that students' preparation and perceived behavioral control over blended learning had an impact on their attitudes regarding its use.
- In relation to the mediators' hypothesis on the actual usage of blended learning in higher education, it was discovered that students' attitudes regarding the practice had an impact on their behavioral intention to use blended learning and their actual use of it.
- In relation to the dependent factors hypothesized on the actual use of blended learning in higher education, it was discovered that students' behavioral intention to use blended learning had an impact on that use.

5.2. Conclusions and Future Work

The study's conclusions indicated that students were ready for blended learning. Blended learning would "redefine higher education institutions as learning-centered and encourage a greater learning experience" [93] if it were applied in the teaching and learning process. However, first and foremost, we must assess students' readiness; otherwise, if we do not assess students' readiness, ability, and requirements [94–98], we risk failing. In order to forecast and explore the elements that influenced students' behavioral intentions to use and their actual usage of blended learning as well as investigating the impact of blended learning, this study was created. The results showed that students' readiness for and perceived behavioral control of blended learning can be significantly influenced by self-directed learning, students' self-efficacy, motivation to learn, learning control, and learning autonomy. Blended learning may offer students positive learning advantages. Students' readiness and perceived behavioral control primarily influenced students' attitudes toward use, whereas students' attitudes toward use influenced students' behavioral intention to use and actual use of blended learning. In addition, students' attitudes toward blended learning had significant mediating effects on their behavioral intention to use and actual use of blended learning. There are also some issues with this research. The study initially had a small sample size because it only examined one public university in Saudi Arabia. Future research may therefore be expanded to incorporate more private and public higher education universities, as well as the opinions of lecturers. Second, data from 345 university students, the majority of whom are undergraduates, were collected for the current study using a quantitative cross-sectional research methodology. In order to verify that the data are significant and generalizable, future studies may use a bigger sample size. To fully analyze and interpret results, qualitative data must be included, such as interviews. Future blended learning research should concentrate on the interactions and engagement of students as well as how pedagogy and course designs affect their participation in a mixed learning approach.

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Institutional Review Board Statement: The study was approved by the Research Ethics Committee at King Faisal University (Approval ID: KFU-REC-2021-NOV-ETHICS15; Approval Date: 2011).

Informed Consent Statement: Ethical review and approval were waived for this study due to the fact that this research adopted a questionnaire from previous research. Please refer to Section 3.2, "Instruments and Measurement Model". Additionally, I distributed the questionnaire to the students I teach, as well as to students in other classes at the same university. Therefore, all the students who answered the questionnaire agreed once they responded. Those who did not agree to respond to the questionnaire were excluded.

Data Availability Statement: Not applicable.

Conflicts of Interest: The author declares no conflict of interest.

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