

## Student Teachers' Attitudes towards Blended Learning

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### Abstract

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This study investigated the attitudes of student teachers towards several dimensions of blended learning to determine their readiness for blended learning. The study also sought to find out if teachers' attitudes towards blended learning were related to age, sex, year group, student specialization, part-time or full-time status and place of residence. The study adopted a survey research methodology to examine students' attitudes towards blended learning. Respondents consisted of 807 student teachers from two campuses of a university in Trinidad. Analyses for the research questions consisted of t-tests, analysis of variance, Pearson Correlation Coefficient using the Statistical Package for Social Scientists (SPSS-V. 17). Exploratory factor analysis with varimax rotation was used to determine the underlying factor structure of the blended learning scale. Exploratory factor analysis supported six factors that explained 56.3% of the variance. Reliability estimates ranged from .731 to .857. Results indicated that teachers viewed learning flexibility and technology as the most important or valued aspect of blended learning. There were also significant differences in students' attitudes based on sex, part-time/full-time status, primary and secondary specialization, age and year group. There was a significant positive correlation between online learning and online interaction and technology. Significant negative correlations were found between online learning and classroom learning and online environment. Implications and recommendations for improvement were suggested for creating an improved survey instrument and providing a more supportive blended learning environment.

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Keywords: blended learning, student teachers' perceptions, e-readiness, student characteristics

### Introduction

Rapidly changing internet technologies have forced higher education institutions (HEI) worldwide to rethink the way they deliver courses, cater to growing student numbers and increased student diversity. Additionally there has been, and continues to be, a demand for quality learning and teaching at HEIs. According to Livingstone (2015) HEIs must make every attempt to replace teacher-centred strategies with more student-centred approaches. One strategy many HEIs are using to facilitate a more student-centred approach is blended learning. Graham (2006) defined blended learning as the combination of traditional face-to-face learning and e-learning. This pedagogical approach combines on-line (asynchronous and/or synchronous) and face-to-face contact time between lecturers and students and/or between students in a course (Graham, Woodfield, & Harrison, 2013). It is an approach which enables learning to occur independent of time and place. Garrison and Vaughan (2008) viewed this form of learning as one that effectively included the right mix of learning environments to enhance the learning experience and offer a student-centred, self-paced, flexible and multifaceted approach to the learning and teaching process.

Furthermore, it can help students develop important twenty-first century skills such as communication, information literacy, creativity and collaboration and develop the ability to use digital technologies for a range of purposes (Zurita, Hasbun, Baloian, & Jerez, 2015). While these are important skills, students' ability to acquire these skills will depend on their readiness to learn in a blended learning environment.

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## Research Problem and Purpose

Research on blended learning has been done in the context of developed countries. However, little research has been carried out in small island developing countries like Trinidad and Tobago to examine university students' attitudes towards various learning aspects that can affect students' readiness for blended learning. On the other hand, the university under study is moving ahead with technology integration on the assumption that classrooms are populated with millennial learners who are comfortable with the use of technology. The remnants of the colonial system in Trinidad and Tobago have perpetuated in the primary and secondary classrooms resulting in classroom instruction that has been largely teacher-directed (Layne, Jules, Kutnick, & Layne, 2008). This pedagogical approach focuses on memorization of notes, with no opportunities for critical inquiry and is characterized by a lack of student participation and low levels of social inclusion skills (Layne et al., 2008). While the introduction of blended learning may result in a more student-centred approach which is aligned with the constructivist views of teaching and learning, there is often limited consideration of students' readiness for such changes.

The purpose of this study was to investigate the attitudes of student teachers towards several dimensions of blended learning to determine their readiness for blended learning. Additionally, the study also supports the development of an instrument to measure students' perceived readiness to engage in blended learning. Specifically the research sought to obtain empirical evidence of the construct validity and internal consistency of an instrument originally developed by Tang and Chaw (2013) and modified by the authors of this paper. This determination is then a precursor to future studies of predictability of the measure.

## Background

Trinidad and Tobago, a twin-island state located in the Caribbean is a post-colonial society that gained independence from Britain in 1962. As such many of the social, cultural and educational institutions continue to exhibit the effects of colonialism. The current study was conducted at the education faculty of a university in Trinidad and Tobago. The programme for teacher development at this university began in 2006, and offers a Bachelor of Education (B Ed.) degree in Primary Education, Early Childhood Care and Education (ECCE), Special Needs Education, and several specializations in secondary education. The Blackboard course management system (BbCMS) was introduced in the university in 2008 and was available for use by instructors from 2009 to 2014. The CANVAS learning management system (LMS) was introduced in 2013 and was available for use in 2014.

Like many other educational institutions worldwide, the university under study has responded by initiating plans to adopt a technological approach to reduce cost, increase student numbers and enhance teaching and learning. As part of this response, the university has been encouraging instructors to integrate the CANVAS learning management system into their teaching.

Most students at the university under study would have been educated in a post-colonial system at both primary and secondary school, and it is reasonable to assume that their experiences in the school system would have an influence on the way they react to new student centred pedagogical methods at university level. This would be predominantly applicable where instructional strategies differ considerably from those that were formerly used to educate them. In this regard, it is important for university educators to understand university students' readiness for blended learning by considering the factors that may affect this method of delivery of instruction.

## Literature Review

The study drew from the theoretical perspectives of Bandura(1977) social cognitive theory and the notion of self-efficacy and the Technology Acceptance Model (Davis, 1989) Self-efficacy is defined as one's belief in their capability to perform a specific task (Bandura, 1977). A strong sense of self-efficacy helps people approach difficult tasks as challenges to be mastered rather than as threats to be avoided, fostering "intrinsic interest" and "deep engrossment in activities" (Bandura, 1994, p. 1). Individuals who perceive themselves capable of performing certain tasks or activities are considered to have high self-efficacy and are more likely to attempt these tasks and activities and vice-versa (Teo & Ling Koh, 2010).

Further research into self-efficacy and the adoption of technology led to the concept of computer self-efficacy (Shih & Huang, 2009). Computer Self-efficacy (CSE) refers to a judgment of one's capability to use a computer, (Teo & Ling Koh, 2010).

Individuals with higher computer self-efficacy beliefs tend to see themselves as able to use computer technology whilst those with lower computer self-efficacy beliefs, become more frustrated and anxious when working with computers (Teo & Ling Koh, 2010). Teo (2009) investigated the relationship between computer self-efficacy and intended use of technology and found that teachers' self-efficacy was a significant influence on the use of technology. Similarly, Hsiao, Tu and Chung (2012) in their research on the function of social support and computer self-efficacy found that computer self-efficacy appears to have a significant influence on computer use.

The Technology Acceptance Model (TAM) (Davis, 1989) has been widely used to predict user acceptance and use of a technology system based on perceived usefulness and ease of use. The model also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use.

In this study, perceived usefulness can be defined as the degree to which students perceive that being involved in blended learning would improve their learning performance. Perceived ease of use can be defined as the degree to which students perceived that being involved in blended learning would be free from cognitive effort. Once student teachers recognize that a blended learning environment can improve their learning performance and learning efficiency and allow them to interact with their classmates and teachers more conveniently, they could possibly adopt blended learning and feel satisfied with blended learning. Davis, Bagozzi and Warshaw (1992) considered perceived enjoyment as the intrinsic motivation. Perceived enjoyment was defined as the extent to which the activity of using the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated (Davis et al., 1992). It has been confirmed that perceived enjoyment places emphasis on the pleasure and inherent positive feeling from specific behaviour. Venkatesh and Davis (2000) defined it as the degree to which using a specific system is enjoyable and pleasant regardless of any consequences due to system use. In this study, perceived enjoyment can be defined as students' enjoyable experience in operating in a blended learning environment. Because blended learning offers students fun and pleasure, student teachers can enjoy themselves in a blended learning environment and be willing to accept it as a form of course delivery.

### Research Questions

1. What is the underlying factor structure of the attitude towards blended learning scale?
2. What attitudes towards blended learning are perceived as most important?
3. Are there differences in student teachers' attitudes towards blended learning based on a) sex (male and female) b) location (urban and rural) c) Status (Part-time and Full-time) d) Specialization (Primary and Secondary) e) Year Groups (Year 1-4) and g) Age?
4. What is the relationship between the different aspects of blended learning?

### Methodology

This is a quantitative study which used a survey research methodology. A survey was considered appropriate as it allowed the researchers to examine blended learning factors individually and their correlations with each other (McMillan & Schumacher, 2006). A questionnaire was used to investigate students' attitudes towards several dimensions of blended learning and whether their attitudes were related to selected demographic characteristics: age, sex, year group, area of specialization and place of residence. Random sampling was used to select 807 student teachers from two campuses of a university in Trinidad. There were 378 students from the south campus (located in the south of the country) and 429 students from the north campus (located in the north of the country). The sample comprised 90 males and 717 females. Their ages ranged from 20 years and under (225), 21-25 years (331), and 26 years and over (251). The year groups included 221 Year 1, 190 Year 2, 195 Year 3 and 201 Year 4 students. Of the 807 students, 144 (18%) were part-time students and 663 (82%) were full time students. With regard to the area of specialization there were 611 students in the primary specialization and 196 students in the secondary specialization. Geographic location while pursuing the degree i.e. urban or rural was also taken into account. This comprised 382 students living in a rural community and 425 students in an urban community. Table 1 shows the demographic characteristics of participants.

**Table 1: Demographic Characteristics**

Demographic	N (%) Students
<i>Year Groups</i>	
1	221 (27%)
2	190 (24%)
3	195 (24%)
4	201 (25%)
Total	807 (100%)
<i>Status</i>	
Part Time	144 (18%)
Full Time	663 (82%)
Total	807 (100%)
<i>Specialization</i>	
Primary	611 (75%)
Secondary	196 (24%)
Total	807 (100%)
<i>Sex</i>	
Males	90 (12%)
Females	717 (88%)
Total	807 (100%)
<i>Age</i>	
≤20	225 (28%)
21-25	331 (41%)
≥26	251 (31%)
Total	807 (100%)
<i>Location</i>	
Rural	382 (47%)
Urban	425 (53%)
Total	807 (100%)

### Instrument

The survey instrument measuring students' attitudes was adapted from Tang and Chaw (2013) study on student readiness for blended learning. Their instrument consisted of 34 items that measured students' attitudes towards six different aspects of blended learning: learning flexibility (4 items); online learning (8 items); study management (6 items); technology (4 items); classroom learning (5 items) and online interaction (7 items).

Learning flexibility reflected issues such as access to learning materials and freedom to decide where and when to study and at what pace. Online learning included items on how comfortable students felt about self-directed learning. Study management referred to how motivated students are to organize their time when studying on-line. Technology consisted of items that reflected students' familiarity with digital technologies. Online interaction referred to students' ability to use web technologies to collaborate with other students for assignments and to interact with the lecturer. Classroom learning focused on students' preferences for face-to-face interaction with other students and the lecturer.

The following modifications were made to the instrument: Two (2) items were added to Online learning: 1) "I am able to understand course related information when it is presented in video format" (Item 13) and 2) "I can learn from things I hear like audio recordings or podcasts" (Item 14) (See Appendix 1). Two items were eliminated from Study management: 1) "Online learning encourages me to make plans" and 2) "I can study over and over again online". These items were replaced by one item that read: "I like to learn in a group, but I can learn on my own as well" (Item 17). In the Technology category, one item was rephrased to read "I am comfortable using Web technologies" (Item 22) instead of "I find Web technologies easy to use" and another item "I am familiar with Web technologies" was amended to "I am comfortable using my computer" (Item 20). Two items were added to Online interaction.

These were: "I am able to express myself clearly through my writing (e.g. mood, emotions, content) (Item 35) and "I respect opinions and information provided by others in online communities" (Item 37). The item "I find it easy to communicate with others online" was rephrased to read "I am able to communicate effectively with others using online technologies (e.g. e-mail, chat, discussion boards)" (Item 33) (See Appendix 1).

The final instrument consisted of 37 items that related to six categories of blended learning: 4 items (Learning flexibility), 10 items (Online learning), 5 items (Study management), 4 items (Technology), 5 items (Classroom learning) and 9 items (Online interaction). The first section of the survey instrument gathered demographic data from participants (sex, age, year group, specialization, enrolment status and residence (urban or rural). In the second section participants were asked to indicate their attitude to each of the 37 items on a five - point Likert scale ranging from Strongly Disagree to Strongly Agree (with 1 being strongly disagree and 5 being strongly agree).

### **Analysis of Data and Findings**

Exploratory factor analysis was employed to identify the factor structure of the blended learning instrument. Descriptive and inferential statistics were used to analyze the research questions. Statistical tests that were performed with the help of the Statistical Package for Social Scientists (SPSS-v-17) software were factor means, t-tests, Pearson Moment Product Correlation and Analysis of Variance.

#### **Findings: Exploratory factor analysis**

##### **Research question 1: What is the underlying factor structure of the blended learning scale?**

Students' responses to all 37 items were factor analyzed using principal component analysis with varimax rotation. The Kaiser-Meyer-Okin (KMO) measure of sampling adequacy was 0.902 which is above the recommended value of .6 (Hair, Black, Babib, & Anderson, 2009) and the Bartlett's test of sphericity was significant ( $X^2(561) = 11594.13$ )  $p < .05$ ). Given these overall indicators, it was feasible to perform exploratory factor analysis.

The factor analysis revealed 6 factors that explained 56.3% of the variance. The construction of the six factors was guided by a factor loading cut-off of 0.40, the factor eigen values (eigen value greater than one rule) and the meaningfulness of each item on the dimension and the reliability score of each factor (Bastick & Matalon, 2007).

The initial eigen values showed that Factor 1 explained 23.55% of the variance, Factor 2, 13.18%, Factor 3, 6.05%, Factor 4, 4.67%, Factor 5, 4.179% and Factor 6, 3.98% of the total item variance (Table 2). The six factors were also supported by the scree plot which showed a 'leveling off' of eigen values after six factors.

The factor labels are: Online learning (Factor 1 with 7 items), Classroom learning (Factor 2 with 7 items), Online interaction (Factor 3 with 6 items), Technology (Factor 4 with 5 items), Learning flexibility (Factor 5 with 5 items) and Online environment (Factor 6 with 4 items) (Table 2).

All items did not load as hypothesized. The category Study management no longer existed as items loaded on other factors. Three items in this category loaded on Factor 1 (Online learning). These were "I organize my time better when studying online"; "Online learning motivates me to prepare well for my studies"; and "Online learning makes me more responsible for my studies". Another item "I like to learn in a group, but can learn on my own as well" loaded on Factor 2 (Classroom learning). The final item in this category ("I am more likely to miss assignment due dates in an online environment") loaded on Factor 6 (Online environment). A new factor was generated which was Factor 6 (Online environment). The items in this factor related to issues such as boredom, difficulty and isolation when studying in an online environment. As the items in this factor were negative the coding was reversed for the purpose of analysis with 1 being Strongly Agree and 5 being Strongly Disagree. Of the 37 items, three did not load on any of the factors and were excluded from subsequent analysis. These were: "Can understand course related information when presented in video format"; "Can learn from audio recordings and podcasts"; and "Would like to interact with other students outside of the classroom".

The number of items in Factor 2 Classroom learning increased from five to seven as two other items loaded on this factor. These were: "I believe face-to-face learning is more effective than online learning" and "I like to learn in a group, but can learn on my own as well". Factor 3 - Online interaction now consisted of 6 items as item 29 ("I feel isolated in an online environment" loaded on Factor 6, and item 30 ("Comfortable using Web technologies") loaded on Factor 4 (Technology). Factor 4 (Technology) now consisted of 5 items. For Factor 5 (Learning flexibility) 4 items loaded as hypothesized. However item 6 ("I am comfortable with self-directed learning") loaded on Factor 5. Factor 5 now consisted of 5 items.

Cronbach alpha was computed for each of the six factors as evidence of the internal consistency reliability of the constructs. Cronbach alpha was greater than .70, thus achieving the acceptable reliability criterion suggested by Hair et al. (2009). Cronbach alpha ranged from .731 to .857 and reliability for the entire instrument was .845 (Table 3).

**Table 2: Loadings of the 6-Factor solution principal component analysis result**

Item		Factors					
		1	2	3	4	5	6
	<b>Factor 1 Online learning (7)</b>						
7	I do not resist having my lessons online.	.603					
8	I like online learning as it provides richer instructional content.	.725					
9	I would like lecture time in the classroom to be reduced.	.410					
10	I would like to have my classes online rather than in the classroom.	.690					
16	I organize my time better when studying online.	.719					
18	Online learning motivates me to prepare well for my studies.	.764					
19	Online learning makes me more responsible for my studies.	.713					
	<b>Factor 2 Classroom learning (7)</b>						
5	I believe face-to-face learning is more effective than online learning.		.560				
17	I like to learn in a group, but I can learn on my own as well.		.502				
24	I have a sense of community when I meet other students in the classroom.		.580				
25	I like the fast feedback when I meet my lecturer in person.		.669				
26	I find learning through collaboration with others face-to-face is more effective.		.802				
27	I learn better through lecturer-directed classroom-based activities.		.743				
28	I learn better when someone guides me personally in a face-to-face setting.		.740				
	<b>Factor 3 Online interaction (6)</b>						
31	I would like to interact with my lecturer online.			.556			
33	I am able to communicate effectively with others using online technologies (e.g. email, chat, discussion board.)			.652			
34	I appreciate easy online access to my lecturer			.657			
35	I am able to express myself clearly online through my writing.			.706			
36	I can collaborate well with a virtual team in doing assignments.			.659			
37	I respect opinions and information provided by others in online communities.			.684			
	<b>Factor 4 Technology (5)</b>						
20	I am comfortable using my computer.				.656		
21	I believe the Web is a useful platform for learning.				.770		

		Factors					
		1	2	3	4	5	6
22	I am comfortable using Web technologies.				.803		
23	I think we should use technologies in learning.				.710		
30	I am comfortable in using Web technologies to exchange knowledge with others.				.556		
<b>Factor 5 Learning flexibility (5)</b>							
1	I would like unlimited access to lecture materials.					.572	
2	I would like to decide where I want to study.					.714	
3	I like to study at my own pace.					.794	
4	I would like to decide when I want to study.					.794	
6	I am comfortable with self-directed learning.					.435	
<b>Factor 6 Online environment (4)</b>							
11	I get bored when studying online.						.840
12	I find it very difficult to study online.						.823
15	I am more likely to miss assignment due dates in an online environment.						.579
29	I feel isolated in an online environment.						.526
Eigenvalue		8.00	4.75	2.058	1.590	1.421	1.354
Variance		23.55	13.186	6.053	4.677	4.179	3.982

**Table 3 Reliability Statistics**

Factor	Items	Cronbach Alpha
.Online Learning	7	.857
Classroom Learning	7	.822
Online Interaction	6	.822
Technology	5	.830
Learning Flexibility	5	.731
Online Environment	4	.752
Overall	34	.845

**Research question 2: What attitudes to blended learning are perceived as most important?**

This research question used descriptive statistics to ascertain which attitudes towards blended learning factors students viewed as the most important. The means and standard deviations were used for comparison. Of the six blended learning factors students rated learning flexibility (M=4.14) followed by technology (M=4.12) and classroom learning (M=4.11) as the more important aspects of blended learning. Online environment was viewed as least important (M= 2.89) (Table 4).

**Table 4: Attitudes towards Blended Learning Factors: Scale Mean, N and Standard Deviation**

Blended Learning Factors	N	Mean	SD
Learning Flexibility	807	4.14	.628
Technology	807	4.12	.654
Classroom Learning	807	4.11	.667
Online Interaction	807	3.74	.722
Online Learning	807	2.95	.834
Online Environment	807	2.89	.939

**Research Question 3: Are there differences in student teachers' attitudes towards blended learning based on a) sex b) location (urban and rural) c) status (full-time and part-time) d) specialization (primary and secondary) e) year groups (year 1 to 4) and age?**

#### 2(a) Differences based on Sex

T-tests results (Table 5) showed that there was a significant difference between male and female attitudes on factor 1 - Online learning. Male students had a more positive attitude ( $M= 3.17$ ) towards online learning than female students ( $M= 2.92$ ).

**Table 5 : T-tests results comparing male and female students' attitudes**

Factor	Sex	N	Mean	S.D.	t	Sig
F1	M	90	3.17	0.841	2.72	.008*
	F	717	2.92	0.829		
F2	M	90	4.99	0.712	-1.60	.112
	F	717	4.13	0.661		
F3	M	90	3.86	0.884	1.31	.193
	F	717	3.73	0.698		
F4	M	90	4.22	0.737	1.50	.137
	F	717	4.10	0.642		
F5	M	90	4.14	0.763	.036	.971
	F	717	4.14	0.609		
F6	M	90	2.81	1.00	-.747	.456
	F	717	2.89	0.931		

\* $p < 0.05$

Key: F1- Online Learning  
 F2- Classroom Learning  
 F3- Online interaction  
 F4- Technology  
 F5- Learning Flexibility  
 F6- Online Environment

#### 2(b) Location (Urban and Rural)

There were no significant differences in students' attitudes on the six different aspects of blended learning in urban and rural communities as shown in Table 6.



**Table 6: T-Test Results Comparing Urban and Rural Students' Attitudes**

Factor	Status	N	Mean	S.D.	t	Sig
F1	U	425	2.97	0.801	.944	.345
	R	382	2.91	0.870		
F2	U	425	4.08	0.664	-1.41	.160
	R	382	4.15	0.670		
F3	U	425	3.76	0.707	.648	.517
	R	382	3.73	0.739		
F4	U	425	4.13	0.637	.559	.576
	R	382	4.10	0.673		
F5	U	425	4.14	0.634	.084	.933
	R	382	4.14	0.621		
F6	U	425	2.87	0.923	-517	.605
	R	382	2.90	0.958		

\*p < 0.05

Key: F1- Online Learning  
 F2- Classroom Learning  
 F3- Online interaction  
 F4- Technology  
 F5- Learning Flexibility  
 F6- Online Environment

**2(c) Differences based on Full Time and Part Time status**

The T-tests results (Table 7) showed that there was a significant difference in students' attitudes between Part-time and Full-time students. Part-time students had a more positive attitude (M= 4.18) than full-time students (M= 3.96) with regard to Factor 5 - Learning flexibility.

**Table 7: T-Test Results Comparing Part-Time and Full-Time**

Factor	Status	N	Mean	S.D.	t	Sig
F1	P	663	2.96	0.844	.690	.491
	F	144	2.90	0.787		
F2	P	663	4.11	0.675	.141	.888
	F	144	4.10	0.632		
F3	P	663	3.76	0.734	1.19	.235
	F	144	3.68	0.661		
F4	P	663	4.13	0.674	.951	.343
	F	144	4.07	0.550		
F5	P	663	4.18	0.603	3.52	.001*
	F	144	3.96	0.705		
F6	P	663	2.88	0.947	-131	.329
	F	144	2.89	0.908		

\*p < 0.05

Key: F1- Online Learning  
 F2- Classroom Learning  
 F3- Online interaction  
 F4- Technology  
 F5- Learning Flexibility  
 F6- Online Environment

## 2 (d) Differences based on Primary and Secondary Specialization

The T-tests (Table 8) results showed that there were significant differences between students enrolled in the primary and secondary specialization programme on Factor 3 - Online interaction and Factor 4 - Technology. Secondary Specialization students had more favorable attitudes towards Online interaction (M= 3.85) and Technology (M= 4.23) than primary specialization students (M= 3.71) and (M= 4.08) respectively.

**Table 8: T-Test Results Comparing Primary and Secondary Specializations**

Factor		N	Mean	S.D.	t	Sig
F1	P	611	2.92	0.842	-1.81	.071
	S	196	3.04	0.803		
F2	P	611	4.10	0.675	-.860	.390
	S	196	4.15	0.642		
F3	P	611	3.71	0.725	-2.36	.019*
	S	196	3.85	0.703		
F4	P	611	4.08	0.659	-2.82	.005*
	S	196	4.23	0.626		
F5	P	611	4.15	0.608	.366	.714
	S	196	4.13	0.687		
F6	P	611	2.90	0.934	.666	.921
	S	196	2.85	0.958		

\*p < 0.05

Key: F1- Online Learning  
 F2- Classroom Learning  
 F3- Online interaction  
 F4- Technology  
 F5- Learning Flexibility  
 F6- Online Environment

## 2 (e). Differences between Year Groups

Results of the one way analysis of variance showed significant group differences for five factors: Online learning (F (3, 803) =15.4, p=0.000); Classroom learning (F (3, 803) = 5.52, p = 0.000); Online interaction (F (3, 803) = 6.46, p =0.000); Technology (F (3, 803) = 5.94, p=0.001); and Learning flexibility (F (3, 803) = 5.40, p=0.001) (Table 9). The Scheffé post hoc multiple comparison procedure indicated significant differences between groups for the following factors: *Online learning*: Year 2 (M=2.85, SD=.783), Year 3 (M=3.03, SD=.876) and Year 4 students (M=3.22, SD= .808) had more favorable attitudes towards online learning experiences than Year 1 students (M= 2.71, SD=.783) (Table 10). *Classroom learning*: Year 1 students had more positive views of classroom learning (M= 4.24, SD=.617) than Year 2 students (M=4.06, SD=.657) and Year 4 students (M= 3.99, SD=.693). *Online interaction*: Year 3 students (M=3.81, SD=.732) and Year 4 students (M=3.89, SD=.720) had more positive attitudes towards online interaction than Year 1 students (M=3.60, SD= .683) (Table 10). *Technology*: Year 2 (M=4.05, SD=.669) and Year 4 students (M= 4.24, SD=.586) had more positive attitudes towards use of technology than Year 1 students (M=4.01, SD = .684) (Table 10).

*Learning flexibility* - Year 3 (M=4.21, SD =.584) and Year 4 students (M = 4.24, SD =.629) had more positive attitudes towards Learning flexibility than Year 1 students (M=4.02, SD = .650) (Table 10).

**Table 9: One way Analysis Variance Result for Year Groups**

		SS	df	MS	F	p
Online Learning	Between Groups	30.6	3	10.2	15.4	.000*
	Within Groups	530.4	803	.661		
	Total	561.0	806			
Classroom Learning	Between Groups	7.25	3	2.42	5.52	.001*
	Within Groups	351.6	803	.438		
	Total	358.8	806			
Online Interaction	Between Groups	9.89	3	3.30	6.46	.000*
	Within Groups	410.1	803	.511		
	Total	420.0	806			
Technology	Between Groups	7.48	3	2.49	5.94	.001*
	Within Groups	337.2	803	.420		
	Total	344.7	806			
Learning Flexibility	Between Groups	6.28	3	2.10	5.40	.001*
	Within Groups	311.4	803	.388		
	Total	317.7	806			
Online Environment	Between Groups	4.88	3	1.63	1.85	.137
	Within Groups	706.1	803	.879		
	Total	711.0	806			

\*p < 0.05

- Key: F1- Online Learning
- F2- Classroom Learning
- F3- Online interaction
- F4- Technology
- F5- Learning Flexibility
- F6- Online Environment

**Table 10: Scale Means & Standard Deviation by Year Groups**

Factors	Group	N	M	SD
Online Learning	1	221	2.71	.783
	2	190	2.85	.783
	3	195	3.03	.876
	4	201	3.22	.808
Classroom Learning	1	221	4.24	.617
	2	190	4.06	.657
	3	195	4.14	.683
	4	201	3.99	.693
Online Interaction	1	221	3.60	.683
	2	190	3.70	.727
	3	195	3.81	.732
	4	201	3.89	.720
Technology	1	221	4.01	.684
	2	190	4.05	.669
	3	195	4.18	.646
	4	201	4.24	.586
Learning Flexibility	1	221	4.02	.650
	2	190	4.10	.622
	3	195	4.21	.584
	4	201	4.24	.629
Online Environment	1	221	2.76	.909
	2	190	2.94	.892
	3	195	2.89	.995
	4	201	2.95	.953

## 2 (g). Differences between Age Groups

Results of the analysis of variance indicated significant differences according to age groups for Online learning ( $F(2, 804) = 6.11, p = .002$ ) and Online environment ( $F(2, 804) = 4.37, p = .013$ ) (Table 11). The Scheffé post hoc multiple comparison procedure revealed that younger students ( $\leq 20$ ) had less positive views ( $M = 2.78, SD = .820$ ) than older students (21 - 25) ( $M = 2.99, SD = .846$ ) and ( $\geq 26$ ) ( $M = 3.03, SD = .815$ ) with regard to online learning (Table 12). Also, younger students ( $\leq 20$ ) had less positive views about Online environment ( $M = 2.73, SD = .933$ ) than students 21-25 years ( $M = 2.94, SD = .921$ ) and 26 and over ( $M = 2.95, SD = .956$ ) (Table 12).

**Table 11: One way Analysis Variance Result for Age Groups**

		SS	df	MS	F	p
Online Learning	Between Groups	8.39	2	4.20	6.11	.002*
	Within Groups	552.5	804	.687		
	Total	560.9	806			
Classroom Learning	Between Groups	1.61	2	.802	1.81	.165
	Within Groups	357.2	804	.444		
	Total	358.8	806			
Online Interaction	Between Groups	1.77	2	.725	1.70	.183
	Within Groups	418.2	804	.520		
	Total	420.0	806			
Technology	Between Groups	2.62	2	1.31	3.07	.047
	Within Groups	342.1	804	.426		
	Total	344.7	806			
Learning Flexibility	Between Groups	.443	2	.222	.562	.571
	Within Groups	317.3	804	.395		
	Total	317.7	806			
Online Environment	Between Groups	7.64	2	3.82	4.37	.013*
	Within Groups	703.3	804	.875		
	Total	711.0	806			

\*p < 0.05

Key: F1- Online Learning  
 F2- Classroom Learning  
 F3- Online interaction  
 F4- Technology  
 F5- Learning Flexibility  
 F6- Online Environment

**Table 12: Scale Means & Standard Deviation by Age Group**

Factors	Group	N	M	SD
Online Learning	≤ 20	225	2.78	.820
	21-25	331	2.99	.846
	≥ 26	251	3.03	.815
Classroom Learning	≤ 20	225	4.18	.625
	21-25	331	4.08	.673
	≥ 26	251	4.09	.694
Online Interaction	≤ 20	225	3.72	.747
	21-25	331	3.71	.748
	≥ 26	251	3.81	.659
Technology	≤ 20	225	4.04	.698
	21-25	331	4.12	.650
	≥ 26	251	4.18	.612
Learning Flexibility	≤ 20	225	4.11	.585
	21-25	331	4.14	.634
	≥ 26	251	4.17	.657
Online Environment	≤ 20	225	2.73	.933
	21-25	331	2.94	.921
	≥ 26	251	2.95	.956

Pearson Moment Correlation was used to examine the inter-relationship between the blended learning factors. Online interaction and use of technology had the strongest correlation ( $r = .58, p < .01$ ). There were also significant positive relationships between online learning and online interaction ( $r = .50, p < .01$ ), online learning and technology ( $r = .40, p < .01$ ) and online environment and online learning ( $r = .44, p < .01$ ). Results also showed a moderate positive relationship between online interaction and learning flexibility ( $r = .33, p < .01$ ). On the other hand, classroom/face-to-face learning was negatively related to online learning ( $r = -.41, p < .01$ ) and online environment ( $r = -.44, p < .01$ ). It appears that students who have more positive attitudes to classroom learning also tended to have less positive attitudes towards online learning experiences. Also classroom learning was not related to online interaction ( $r = .17, ns$ ) and technology ( $r = .08, ns$ ) as expected.

Results also showed positive, but smaller correlations between online learning and learning flexibility ( $r = .22, p < .01$ ); classroom learning and learning flexibility ( $r = .15, p < .01$ ); technology and learning flexibility ( $r = .27, p < .01$ ) and learning flexibility and online environment ( $r = .07, p < .01$ ) (Table 13).

**Table13: Pearson Moment Correlations: Relationship Among the Blended Learning Factors**

Factors	Online Learning	Classroom Learning	Online Interaction	Technology	Learning Flexibility	Online Environment
Online Learning	1	-.406**	.502**	.402**	.224**	.436**
Classroom Learning		1	-.049	.061	.146**	-.436**
Online Interaction			1	.584**	.334	.285**
Technology				1	.271**	.191**
Learning Flexibility					1	0.72*
Online Environment						1

\*\*Correlation is significant at the 0.01 level

\* Correlation is significant at the 0.05 level

## Discussion and Recommendations

The findings supported five of the constructs of blended learning as hypothesized from the original instrument. These were online learning, classroom learning, online interaction, technology and learning flexibility. The construct study management no longer existed as items loaded on other factors namely online learning and a new construct which we named online environment. The content of items in this new construct reflected feelings of boredom, isolation and difficulty experienced by students in the online environment. According to Kintuand Zhu (2016) such feelings can affect students' intrinsic motivation. Studies by Sadera, Robertson, Song and Midon (2009) also indicated that a sense of community with other learners is a critical factor in online learning success. A study by Beard, Harper and Riley (2004) found that some learners benefit more from personal interaction with teachers and their peers and therefore prefer face to face sessions of blended learning. Also, some researchers (Marold & Haga, 2004; Bentz, 2009) contend that the kinds of interaction in face to face classroom are difficult to capture in an online environment such as non-verbal expression, gestures, humor and eye contact. These findings suggest the need to examine the design and levels of difficulty of tasks students are required to complete in the blended learning environment.

Learning flexibility was rated as the most important aspect of blended learning followed by technology and classroom learning. Students appreciated the flexibility attributed to blended learning which allowed them the opportunity to work at their own pace and to take charge of their own learning.

Also, students felt more comfortable with various online tools as it gave them unlimited access to course material and the opportunity to communicate with faculty at any time. Based on the finding of this study, male students had a more positive attitude towards online learning than female students. Similar findings were reported also reported by Yau and Cheng (2012) and Shashaani and Khalili (2001) who also found that males have more confidence in using technology for learning than females. Literature suggests that an individual's computer self-efficacy has a significant influence on the use of technology for learning (Hsiao, Tu & Chung, 2012). However, other studies (Bunz, Curry & Voon, 2007; Hung, Chou, Chen & Own, 2010) found that there were no differences in attitudes towards online learning between male and female students. The differences in attitudes between males and females in our study may be because female students have a lower computer self-efficacy which may be as a result of cultural factors whereby females are made to believe that computers are the domain of males.

There were no significant differences in students' attitudes in urban and rural communities. This finding may be explained by the comments of the executive vice president Mobile Services, Telecommunication Service of Trinidad and Tobago (TSTT) Mr. Ronald Walcott in a Trinidad Guardian article written by John-Lall (2013). Mr. Walcott said that the mobile phone and its increasing features are helping to bridge the digital divide in Trinidad and Tobago (T&T). Walcott also suggested that the convergence of the deployment of 4G mobile broadband access technologies along with affordable user-friendly devices has made internet access more accessible to a wider cross-section of the population. As such Geography (location in terms of urban and rural) and income levels are now much less a factor than in years past.

A study done by Zhu (2017) found that part time students at a university had a more positive attitude towards blended learning. These students enjoyed the flexibility of blending learning which afforded them the opportunity to study at their own pace and decide when and where to study. This is confirmed in our results which also showed that there was a significant difference between full time and part time students in terms of learning flexibility. Part time students had a more positive attitude towards blended learning which may be because most of the part time students are working individuals and may have less time to dedicate to full time classes. As such they value the flexibility that is offered by blended learning.

The results of the study showed that students pursuing a secondary specialisation had a more positive attitude towards blended learning in terms of online interaction and technology. These findings differ from those of deLiaño, Leon and Pascual-Ezama (2012) and Karimi and Ahmad (2013) who found that there were no significant differences among different groups of student teachers with regards to satisfaction in a blended teacher education programme. Additionally, Karimi and Ahmad (2013) found that subject matter is not an important item in the delivery of courses using a blended approach. The differences found in our study may be due to the academic qualifications of the students. Students in the secondary specialization tend to be more qualified than students in the primary specialization and this may have resulted in higher levels of computer self-efficacy which results in greater acceptance of blended teaching.

There were significant differences in students' attitudes for five factors according to year groups. These were online learning, classroom learning, online interaction, technology and learning flexibility. In terms of online learning, the year 2, year 3 and year 4 students have a more positive attitude towards online learning as compared to Year 1 students. However, Year 1 students had more positive views of classroom learning when compared to year 2 and year 3 students. In terms of online learning, technology and learner flexibility, year 1 students had the lowest positive attitudes when compared to the other groups.

These differences in attitude may be because year 1 students has a preference for greater teacher-directed learning which may be as a result of their past experiences in the authoritarian classrooms that still exists in both secondary and primary schools (Layne, Jules, Kutnick, & Layne, 2008). Students perhaps still hold a conception of teaching as transmission of information, and teachers as the repository of knowledge to be passed on to students. According to Birbal and Bradshaw (2015) having been taught in an education system characterised by a teacher-centred model of teaching, students find it difficult to accommodate a pedagogical model that is significantly different from the one in which they were instructed.

The data also showed that year 4 students had a more positive attitude towards these five factors. One possible explanation can be that as students are exposed to blended learning strategies it becomes a more acceptable method for teaching and learning.

Findings showed a strong positive relationship between online interaction and technology and online learning and technology. This suggested that students' comfort with Web-based technologies was related to their ability to communicate and learn effectively online. Indeed, studies (Hauser, Paul, Bradley, & Jeffrey, 2012; Vance, 2012) have reported on students' attitudes to technology and success in a blended learning environment. Also, students' positive attitudes towards online learning with regard to access to instructional content, taking responsibility for their learning, time management was positively related with online interaction with their peers and lecturers.

Results also showed a positive association between online environment and online learning. An online environment that is characterized by a sense of belonging as against feelings of isolation and boredom can be conducive to favorable attitudes to online learning in the blended learning environment (Ausburn, 2012; Conceicao & Lehman, 2013).

A moderate positive correlation between online interaction and learning flexibility suggested students' participation in interactive technologies is associated with the flexibility afforded by the blended learning environment such as access to unlimited material, independent and self-directed study.

### Conclusion and recommendations

As more education institutions move towards e-learning as a means of enhancing teaching and learning it is important to understand students' readiness for engaging in e-learning. As the findings of this study show, the readiness of student teachers to participate in blended learning is relatively high among the part-time students and the students in years 2, 3 and 4 of the Bachelor in Education programme. Year 1 students showed a less positive attitude towards many factors involved in blended learning. This study has raised a number of issues pertaining to university students' e-readiness that need to be considered before students can successfully engage in blended learning. This suggests that improvement and preparation of students in many aspects of blended learning is necessary to implement blended learning in a teacher education programme.

As such, one of the recommendations for success in adopting a blended learning approach in teacher education would be to familiarise all stakeholders with the concept of blended learning and the advantages and disadvantages of this type of learning before its implementation.

In addition, the curriculum design should consider the varied learning styles of our student teachers. For example, the proportion of time for face-to-face and online sessions should be re-examined to cater to the different developmental needs of our students. Further, there must be institutional readiness in terms of technology (hardware and software) and personnel to facilitate a blended learning approach. Because blended learning is a relatively new approach in this university and Trinidad and Tobago, more research is needed on blended learning and especially in Teacher Education programmes. Finally, although the revised instrument used to assess the students' readiness for blended learning provided evidence to support that the questions used consistently measured the desired scales, future revisions of the E-learning Readiness Self Assessment instrument may provide researchers with a valid and reliable instrument for measuring the e-readiness of learners for success in a blended learning environment.

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### Appendix 1

#### Items and Six Subscales of Blended Learning Survey

Sub Scales	No	Item
Learning Flexibility	1	I would like unlimited access to lecture materials.
	2	I would like to decide where I want to study.
	3	I like to study at my own pace.
	4	I would like to decide when I want to study.
Online Learning	5	I believe face-to-face learning is more effective than online learning.
	6	I am comfortable with self-directed learning.
	7	I do not resist having my lessons online.
	8	I like online learning as it provides richer instructional content.
	9	I would like lecture time in the classroom to be reduced.
	10	I would like to have my classes online rather than in the classroom.
	11	I get bored when studying online.
	12	I find it very difficult to study online.
Study Management	13	I am able to understand course related information when it is presented in video format.
	14	I can learn from things I hear, like lectures, audio recordings, or podcasts.
	15	I am more likely to miss assignment due dates in an online environment.
	16	I organize my time better when studying online.
Technology	17	I like to learn in a group, but I can learn on my own as well.
	18	Online learning motivates me to prepare well for my studies.
	19	Online learning makes me more responsible for my studies.
	20	I am comfortable using my computer.
Classroom Learning	21	I believe the Web is a useful platform for learning.
	22	I am comfortable using Web technologies.
	23	I think we should use technologies in learning.
	24	I have a sense of community when I meet other students in the classroom.
Online Interaction	25	I like the fast feedback when I meet my lecturer in person.
	26	I find learning through collaboration with others face-to-face is more effective.
	27	I learn better through lecturer-directed classroom-based activities.
	28	I learn better when someone guides me personally in a face-to-face setting.
	29	I feel isolated in an online learning environment.
	30	I am comfortable using Web technologies to exchange information with others.
	31	I would like to interact with my lecturer online.
	32	I would like to interact with other students outside of the classroom.
	33	I am able to communicate effectively with others using online technologies (e.g. email, chat, discussion board.)
	34	I appreciate easy online access to my lecturer.
	35	I am able to express myself clearly online through my writing (e.g. mood, emotions, humour and content)
	36	I can collaborate well with a virtual team in doing assignments.
	37	I respect opinions and information provided by others in online communities.