

Constructing and Validating University Students' Blended Learning Acceptance Scale

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Abstract—Increasingly, blended learning courses are being offered in schools throughout China. One of the key factors influencing the effectiveness of blended learning is students' acceptance. The researchers proposed six predictive dimensions that contribute to students' acceptance for blended learning, namely, perceived usefulness, perceived ease of use, learning climate, attitudes towards online learning, attitudes towards classroom learning and personal charm of the instructor. One existing questionnaire is adapted, together with the interview data with university undergraduates, generating 63 items for the initial questionnaire. The first draft of the scale was distributed to 180 university students in Hubei Province, China. Data collected were analyzed by SPSS 24.0. Eleven items were deleted based on the Exploratory Factor Analysis results. Then the second pilot was done to purify the scale further. 191 questionnaires were distributed, and the data collected were processed by EFA again. One item was removed in the second pilot and 51 items were reserved for the final version of the scale. The final adapted version of Blended Learning Acceptance Scale (BLAS) is reported to possess high levels of reliability and validity. The BLAS can be used to investigate Chinese University students' acceptance for blended learning so that better opinions can be put forward to improve the effectiveness of blended learning.

Keywords—Blended Learning; Acceptance; University Students; Scale

1 Introduction

Increasingly, blended learning courses are being offered in schools throughout China. In the past three years, according to the data collected by the Ministry of Education, nearly 3000 Chinese universities have made use of various online learning systems and mobile phone applications, such as Zhihui Shu, i-Courses, Xuetaang-

zaixian to offer courses. These online learning systems were used concurrently with the face-to-face teaching mode regularly, resulting in the format of blended learning. More than 17 million university students throughout China have got credits from the online learning systems. University students can use informational technologies and recognize the utility of online resources while they are taught under the traditional teaching mode.

As for the situation in Hubei Province, due to the outbreak of COVID-2019, schooling had to be postponed. In February, the Ministry of Education in China advocated universities to utilize online platforms or mobile phone applications to resume teaching activities during the emergency. Currently, more than 80000 students have registered and made use of online learning systems.

2 Problem Statement

It is generally considered that, in the learning process, students are the most prominent feature. One of the key factors influencing the effectiveness of blended learning course is students' acceptance factor [1], [2]. Previous studies have shown that blended learning acceptance functioned as predictors for students' satisfaction, which encourages students to be better involved in blended learning activities and is likely to generate desirable learning results [2]. So, students' acceptance should be considered as an important factor to be taken into account while moving towards blended learning [3].

Culturally, Chinese students prefer teachers' presence in the classroom, and they assume that learning requires face-to-face interaction. If they do not go to school or sit in the real classroom, they will feel that they learn little since there is no learning climate. Though research on blended learning has risen significantly in China in the past years, little is known regarding students' acceptance for blended learning. Hence, there are exigencies to explore Chinese students' acceptance of the notion so as to improve the quality of learning and teaching [4]. However, to date, there is a lack of robust instrument to measure university students' acceptance, especially in the context of Chinese higher institutions. In this study, the researchers sought to adapt existing instrument and develop a new questionnaire which aims at measuring students' acceptance level of blended learning.

3 Research Objectives and Research Questions

Based on the given problems, this study intends to achieve the following research objectives:

1. To identify dimensions that contribute to blended learning acceptance
2. To modify blended learning acceptance instrument based on the domains identified

The corresponding research questions are formed based on the research objectives.

1. What are the domains that may contribute to students' blended learning acceptance?
2. How will the identified domains enhance students' blended learning acceptance instrument?

4 Research Process

The four main processes involved in this study are listed as follows:

4.1 Deciding the domains to be covered in the questionnaire

After reviewing past literature and existing questionnaire, Du Shichun and Fu Zetian's (2018) instrument of blended learning acceptance was chosen as the guiding instrument since they have conducted empirical study to validate the questionnaire. There are five aspects which contribute to blended learning acceptance according to their findings, namely, perceived usefulness, perceived ease of use, learning climate, attitudes towards classroom learning and attitudes towards online learning.

Perceived usefulness reflects the users' subjective assessment of whether using a particular system would enhance job performance [5]. Under the blended learning environment, the perceived usefulness refers to the extent to which a person holds the belief that blended learning functions as a driving force towards achieving learning goals. Ertmer, Gedik, Richardson and Newby (2008) found that learners' perceived usefulness is beneficial for promoting their enthusiasm for learning and make them actively participate in class [6]. When students realize that blended learning mode can improve their creative thinking, collaboration and problem-solving skills, they will become more willing to accept and adopt the learning method. In this sense, perceived usefulness plays a key role in blended learning acceptance.

In the Technology Acceptance Model, perceived ease of use refers to "the degree to which a person believes that using a particular system would be free of effort" [7]. Under the blended learning environment, the perceived ease of use can be defined as the extent to which a learner believes that using blended learning will be free of effort. Examples of perceived ease of use in blended learning may include facilitated content acquisition and ease in communication among users. Previous studies reported that perceived ease of use positively influence students' attitudes and the perceived usefulness of utilizing learning systems [8] and online learning platforms [9]. Likewise, through perceived usefulness, perceived ease of use could affect students' willingness to accept blended learning in direct or indirect manner [2].

Learning climate refers to a positive and enjoyable learning atmosphere that makes learning easy and relaxing. Pleasant learning climate should be set up based on students' physical and cognitive developmental needs, which can influence their thinking and behaviors in subtle ways. Blended learning climate includes both an online learning and an offline learning settings. A desirable learning climate can encourage learn-

ers to work hard, ensure the efficient operation of teaching and learning and improve learning efficiency. Prieto and Revilla (2006) stated that learning climate should be studied from two aspects: physical environment and spiritual environment [10]. Unlike traditional face-to-face teaching method where learning activities take place only in the classroom, blended learning is expected to provide personalized learning spaces that meet the demands of individualized learners. Learning climate contains peer interaction, instructor-student interaction, collaboration and discussion, which are believed to stimulate students' potential and interest and to encourage the exchange of ideas.

4.2 Developing items for the item pool

Interviews were conducted to collect students' opinions of blended learning. Twenty-four respondents who have studied under the environment of blended learning for more than one year were involved, resulting in identification of additional domain and items based on the interview data. The first draft of Blended Learning Acceptance Scale (BLAS) was formed, which consisted of 63 items.

To ensure the instrument's construct and content validity, two lectures who have practiced blended learning for over one year and two professors in the field of education were invited to review the first draft of BLAS. Based on the experts' feedback on relevance of items by domain, item wording as well as sequencing, modifications were made and incorporated in the refined version. Then the researchers asked 10 freshmen without blended learning experience to gauge the possibility of improper item expression. Personal discussions were held to gather opinions about the wording of each item. All misunderstood or confusing items were modified, resulting prior to the pilot test.

4.3 Initial piloting and modification

According to Qin Xiaoqing (2009), it is necessary to pretest the items when starting item analysis in scale construction [11]. Pretesting can help remove vague or ambiguous items. Some items require rewriting based on pre-test result. The pilot of the second draft was conducted in December 2019. BLAS was distributed through WeChat group, the most popular social-media software in China, to collect data from classes in a selected university in Hubei Province, China. 180 respondents submitted BLAS either through their mobile phones or computers. The researcher has set certain requirements for each item. The respondents can only type in the number, from one to five. If they miss the answer of any item, they are unable to submit the questionnaire because the online questionnaire system does not allow them to do so. This step ensures no missing value in the collected data. When checking the time spent in completing the questionnaire, the researchers found that one student only took 61 seconds to complete it and thus removed this invalid questionnaire. Altogether there were 179 completed questionnaires returned in the first pilot.

The collected data was processed by SPSS. The Cronbach's alpha is .966, which indicates that the questionnaire has a high level of internal consistency. Then the Al-

pha If Item Deleted and Corrected Item-Total Correlation were carried out. Those items with item-total correlation lower than .30 should be removed [12]. The Cronbach's alpha reliability coefficient of the scale will increase if the item with correlation less than .30 is removed from the instrument. Those items with item-total correlation of .30 and above should be reserved since they are considered to have correlation with the total score and most of the other items [11]. After analyzing the pilot study data, the coefficients of item No.12 "I can use the online learning system without much help" (.287), No. 13 "I believe I can handle the technical problems when operating the online learning system" (.224), No.35 "I would like to have my classes online rather than in the classroom" (.274), No.36 "I get bored when studying online" (-.124), No.37 "I find it difficult to study online." (-.006) are less than .30, which indicate that these items do not have significant correlation with the total score and should be dropped from the scale. These above-mentioned five items were removed from the scale.

Principal Component Analysis and the Varimax of Rotation Method were done to classify the variables again. Those items having an eigenvalue over 1.0 with the values of factor loading over 0.45 were identified. Items with factor loading less than 0.45 were excluded. The scree plot and rotated matrix shows that 11 factors are extracted. Factors with less than 3 items should be deleted and Items with negative coefficient should be dropped. Hence, items No.31 "I am comfortable with self-directed learning", No.32 "I do not resist having my lessons online", No.34 "I would like lecture time in the classroom to be reduced", No.14 "Technical guidance services are shown in the system instructions" were removed because there are less than three items under one factor. Items No.54 "I believe I can accept blended learning model quickly" and No.33 "I like online learning as it provides richer instructional content" should be excluded since the factor loading value is below 0.45. After conducting the Principal Component Analysis and the Varimax of Rotation Method, 6 items (No.31, No.32, No.34, No.14, No.54, No.33) are removed from BLAS in this step.

Altogether 11 items were dropped from the scale based on the pilot study. 52 items were reserved after the first pilot.

4.4 Final piloting and item analysis

After the initial purifying of BLAS, the second pilot study was done in March, 2020. 191 undergraduates with similar characteristics to the respondents in the first pilot but from another selected university in Hubei Province, which is different from the university in the first pilot, participated in the investigation.

The Cronbach's alpha is .970. The Item-Total Statistics show that the item-total correlation of each item is above .30, thus all the items are kept. The KMO value is .927, which was higher than .60 as recommended by Qin Xiaoqing [11]. The significance level of Bartlett test is .000. The two values indicate that the data collected were appropriate for factor analysis.

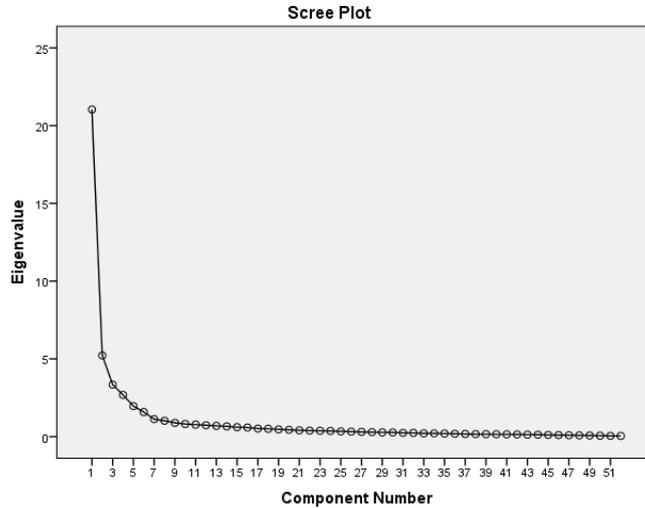


Fig. 1.

The number of factors appeared just before the “elbow” of the plot. As shown in the scree plot, seven factors are considered to be kept. Rotated component matrix showed that item No.30 “I believe face-to-face learning is more effective than online learning” should be excluded because the factor loading is below .45 and there was only one item under this factor. After deleting this item, six factors were extracted. The factor analysis revealed that there are six factors explaining 73.013% of the variance.

4.5 Final version of the scale

After the two pilot studies, modifications were made to the original BLAS. The final version of BLAS consisted of 51 items after deleting 12 items. Six factors were kept as the dimensions that contribute to blended learning acceptance. The original five factors are reserved as hypothesized. They are perceived usefulness, perceived ease of use, learning climate, attitudes toward classroom learning and attitudes toward online learning. A new factor labeled as personal charm of the instructor was added. Five items were loaded on this factor. The items are “I will be more interested in the course if the instructor’s oral English is standard.”; “I like an instructor who can give lectures in humorous way”; “I like an instructor who is strict with me”; “I will be become an active participant if the instructor can design interesting learning activities”; “I am willing to complete creative after-class task assigned by the instructor”.

5 Discussions

The items in the added dimension reflect the influence of instructors' personal charm such as humor, creativity, responsibility on students' acceptance towards blended learning. The findings indicated that regular training program should be carried out to provide instructors with the latest development of their teaching field. Instructors need to pay close attention to students' needs so that students are willing to participate and will be more engaged in blended learning course.

The final version of BLAS can be used to measure Chinese university students' acceptance for blended learning. However, some limitations still exist. For example, the sample size is rather limited. Questionnaires were distributed only to public universities in Hubei Province. Findings from the study cannot be generalized to other provinces in China. It is hoped that future research can bridge this gap and push forward the implementation of blended learning to other places.

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