

# Validation of Learning Engagement Questionnaires: A Pilot Testing Study in Private Colleges and Universities in Xi'an, China

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## Abstract

This research study is designed to validate a set of questionnaires measuring learning engagement among students in private colleges and universities in Xi'an, China. Learning engagement is a critical factor influencing academic performance, and the reliability and validity of assessment tools are essential for meaningful research and effective educational interventions. Through a pilot testing approach, this study seeks to assess the psychometric properties of the questionnaires and ensure their suitability for future research in this context. The findings will provide valuable insights into the validity and reliability of these assessment tools in the specific setting of private higher education in Xi'an.

**Keywords:** learning engagement; pilot testing; private universities.

## 1. Introduction

In the realm of educational research, the concept of learning engagement has gained considerable attention due to its pivotal role in shaping students' academic success and overall learning experiences [1]. Learning engagement refers to the active, positive, and purposeful involvement of students in their educational pursuits, encompassing their emotional, cognitive, and behavioral investment in the learning process [2, 3]. An engaged learner is more likely to be motivated, participate actively in class, and achieve higher academic outcomes.

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Therefore, understanding and measuring learning engagement is vital for educators, institutions, and researchers seeking to enhance the quality of education. Private colleges and universities in Xi'an, China, have been witnessing substantial growth and diversification, contributing significantly to the nation's higher education landscape. These institutions play a crucial role in accommodating a diverse range of students and providing innovative educational approaches. However, to ensure the effectiveness and quality of education in these private settings, it is imperative to employ valid and reliable assessment tools for studying learning engagement.

Thus, this research study embarks on the validation of a set of learning engagement questionnaires tailored to the specific context of private higher education institutions in Xi'an, China. The aim of this pilot testing study is to assess the psychometric properties of these questionnaires and ascertain their suitability for future research endeavors in this unique academic environment.

The validation of learning engagement questionnaires holds paramount significance for several reasons. First and foremost, it allows for the accurate measurement of learning engagement among students in private colleges and universities, thus providing educators and administrators with valuable insights into the factors that drive student motivation and participation. Second, validated assessment tools can serve as a foundation for informed decision-making, enabling institutions to design interventions and strategies that enhance student engagement and, consequently, academic achievement. Lastly, validated questionnaires contribute to the advancement of research in the field of education, facilitating comparative studies, and the development of best practices.

In the following sections of this paper, we will delve into the research background and objectives, methodology, findings, and implications of this pilot testing study. By validating these learning engagement questionnaires, we aim to provide a valuable resource for educators, researchers, and institutions dedicated to fostering an engaged and thriving student body within the private higher education sector in Xi'an, China.

## **2. Research Background and Objectives**

Higher education institutions (HEIs), both in China and on a global scale, have placed a strong emphasis on creating a student-centric educational environment that prioritizes students' learning processes, experiences, and outcomes [4]. Among the primary and enduring objectives of higher education institutions is to ensure student satisfaction and meet students' demands regarding the quality of education they receive. To assess the extent of student satisfaction within these institutions and to gain insight into students' perceptions and expectations in the context of teaching quality, several indicators must be derived from this multifaceted concept, identified, and quantitatively measured. Indeed, student satisfaction is a logically intricate concept with multiple dimensions. While consensus may be lacking regarding the precise definition of academic achievement and its measurement, scholars concur that the most effective means of comprehending college students' academic success is to scrutinize how students allocate their time, invest their efforts, and engage in their learning endeavors. This understanding can be effectively achieved by investigating student learning engagement [5].

In recent years, numerous studies have been conducted to explore college students' investment in their learning and the factors that influence it. For instance, research has delved into the relationship between college students'

learning engagement and their academic performance [5]. Furthermore, the increasing emphasis on quality assurance within HEIs has brought the teaching quality of educators and the quality of students' learning experiences into sharper focus. Learning engagement has emerged as a pivotal factor that can positively impact learning outcomes, student retention, equity, curricular relevance, institutional reputation, marketing efforts, and financial stability [6] .

Numerous assessment tools and rubric assessment scales have been developed by scholars to evaluate students' learning outcomes. For instance, within the context of Chinese HEIs, the Chinese College Students Learning and Development Tracking Survey (CCSS) has been extensively employed by educators to gather valuable data [7] . Furthermore, Tsinghua University's Institute of Education has employed the Chinese version of the "University Student Learning Engagement Questionnaire" (NSSE-CHINA) to investigate the relationship between learning engagement and learning outcomes among Chinese research university students.

Hence, this purpose of this is to validate a set of questionnaires designed to measure learning engagement among students in private higher education institutions in Xi'an, China. This study also aim to provide recommendations for the use of these validated tools in future research.

### **3. Methodology**

#### ***3.1. Participants***

In this study, unit analysis refers to the specific level or entity that forms the primary focus for observation, measurement, and analysis. The central unit of analysis in this research is the individual student. Within the framework of this study, the individual student is at the core of our analytical approach. We meticulously gather and analyze data concerning each student's engagement, behaviors, attitudes, and academic performance. Each student is regarded as a distinct entity, with their unique characteristics, experiences, and responses under scrutiny. This method enables researchers to draw comprehensive conclusions and make informed inferences about the broader student population within the selected private colleges and universities in Xi'an, China.

The unit of analysis is meticulously defined in this study as college students enrolled in ten specific private colleges and universities located in Xi'an, Shaanxi, China. These institutions, including Xi'an Peihua University, Xi'an Eurasia University, Xijing University, Xi'an International University, Xi'an FanYi University, Xi'an Siyuan University, Xi'an Kedagaoxin University, Modern College Of Northwest University, Xi'An Technology And Business College, and Xi'An Vocational University Of Automobile, collectively constitute the target population for the research. A total of 50 students are participating in this pilot testing phase.

#### ***3.2. Questionnaires Design***

Table 1 shows the research instruments resources represent various tools used in academic research to assess and measure different constructs such as learning orientation, engagement, self-regulation, motivation, and more. The number of items associated with each instrument indicates the number of questions or statements that participants are required to respond to when these instruments are employed in research studies. Researchers utilize these instruments to gather data and gain insights into specific aspects of their research topics.

**Table 1:** The research instruments.

<b>Resource</b>	<b>Construct</b>	<b>Number of Items</b>
Jha, S., & Bhattacharyya, S. S. (2013) - Learning Orientation and Performance Orientation Scale	Learning Performance	5
NSSE – CHINA instrument - Learning Engagement	Learning Engagement	5
NSSE – CHINA instrument - Student-Teacher Interaction	Student-Teacher Interaction	5
NSSE – CHINA instrument - Institution Support	Institution Support	5
Akhtar, Javed & Mahmood, Nasir. (2013) - Academic Self-Regulation Scale (ASRS)	Self-regulated learning	5
NSSE – CHINA instrument - Peer Interaction	Peer Interaction	5
NSSE -CHINA instrument - Time Investment	Time Investment	5
NSSE -CHINA instrument - Emphasized on Academic Experience	Emphasis on Academic Experience	5
Shi, Lei & Cristea, Alexandra. (2016) - Motivation Learning Scale	Motivation	5
Mo, Xiuxian & Lu, Lixiang & Liu, Fangting & Qin, Yuwei & Liu, Lanlan & Wen, Lu. (2021) - Pragmatic Education Scale	Pragmatic Education	5

### **3.3. Research Procedures**

Data collection is set to commence on 1 August 2023 and will extend until 14 August 2023. The study encompasses college students ranging from their first to fourth years, representing a diverse array of academic disciplines, spanning humanities, social sciences, and STEM (Science, Technology, Engineering, and Mathematics) fields.

Firstly, during the pilot testing phase, we establish clear objectives for this preliminary test. This includes outlining the specific aims and goals of the pilot test and identifying areas of research that require validation or refinement. In this study, our primary aim is to assess the validity and reliability of our research instruments.

Secondly, a representative sample is meticulously chosen from the target population. We have selected a small yet diverse group of participants consisting of 50 students. This group accurately mirrors the characteristics of the broader study population, which encompasses ten universities.

Thirdly, research instruments have been developed and adapted for this study. Subsequently, these instruments are subjected to pretests. We administer them to a small subset of participants from the pilot sample, paying close attention to any challenges participants may face, such as issues with question clarity, vague phrasing, or technical glitches in online surveys.

Following this, the data obtained from the pilot test is carefully analyzed. We employ basic statistical analyses, including the Cronbach alpha reliability test, to examine quantitative data and identify response trends or patterns. Additionally, we review qualitative feedback to uncover common themes, concerns, or suggested improvements.

Subsequent to data analysis, we refine the research instruments based on the feedback and data insights

gathered. This refinement process may involve rephrasing questions, eliminating ambiguities, or introducing new items to enhance the effectiveness of the instruments.

Upon the completion of the pilot test, we compile a comprehensive report summarizing the procedures, outcomes, and adaptations made to research instruments and procedures based on the pilot test results. This report also includes a discussion of the insights gained and their implications for the full-scale study.

Finally, throughout the pilot test, we rigorously adhere to ethical guidelines. This includes obtaining informed consent from participants and diligently safeguarding their privacy and data to ensure the integrity of the research process.

**4. Research Results and Discussion**

This section discusses about reliability and validity testing.

**4.1. Reliability Testing**

Table 2 shows the reliability testing of Cronbach Alpha for this research instruments. This value represents the overall internal consistency of the 50 items in this research instrument. It is a measure of how closely related these items are to each other in assessing the same underlying construct or dimension. In this case, a Cronbach's Alpha of .937 suggests a high degree of internal consistency, indicating that the items are strongly related to each other and are likely measuring the same underlying concept or trait. Cronbach's Alpha based on standardized items (.953) is slightly higher than the regular Cronbach's Alpha (.937), suggesting that even after standardization, the items in this research instrument still exhibit strong internal consistency. Table 3 Reliability testing of Cronbach Alpha for all constructs' questions. The significance value shows that all constructs is reliable as more than 0.90 .

**Table 2:** Reliability testing of Cronbach Alpha.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.937	.953	50

**Table 3:** Reliability testing of Cronbach Alpha for all constructs' questions.

<b>Student-Teacher Interaction (STI)</b>	<b>Significance value</b>
Provided prompt and detailed feedback on tests or completed assignments	.906
Worked with teacher on activities other than coursework (committees, student groups and other)	.906
Discussed course topics, ideas, or concepts with teacher	.906
Discussed your academic performance with teacher	.907
Talked about career plans with a teacher	.905
<b>Self-Regulated Learning (SRL)</b>	
I consciously make sure that my class attendance does not go below 80%	.910
I can perform well all activities in the class assigned by the teacher	.907

I compete with high achievers among my class fellows	.907
I set goals for attaining grades in the class	.907
SRL_5 I am regular in class because I am well aware of rules to be dropped from a course	.907
<b>Time Investment (TI)</b>	
Preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)	.916
Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.)	.914
Relaxing and socializing (time with friends, video games, TV or videos, keeping up with friends online, etc.)	.919
Doing community service or volunteer work	.912
Of the time you spend preparing for class in a typical 7-day week, about how much is on assigned reading?	.908
<b>Peer Interaction (PI)</b>	
Asked another student to help you understand course material	.909
Explained course material to one or more students	.907
Prepared for exams by discussing or working through course material with other students	.910
Worked with other students on course projects or assignments	.908
Collaborate with peer in practical hand-ons activities	.911
<b>Emphasized on Academic Activities (AA)</b>	
Spending significant amounts of time studying and on academic work	.909
Providing support to help students succeed academically	.907
Using learning support services (tutoring services, writing center, and other)	.910
Providing opportunities to be involved socially	.908
Helping you manage your non-academic responsibilities (work, family, and other)	.911
<b>Motivation (M)</b>	
I felt in control of my learning process.	.935
I felt my learning experience was personalised	.935
It was easy to understand why I received recommendations.	.937
I felt I only needed a few steps to complete tasks.	.935
It was easy to discuss with peers.	.935
<b>Pragmatic Education (PE)</b>	
I can choose appropriate words according to different social situations to achieve communicative purposes.	.936
I can understand and express regret in different social situations, such as "I wish I could go back and start all over again."	.935
I can understand and effectively explain the verbal conflicts caused by cultural differences.	.935
I can understand and effectively explain the verbal conflicts caused by cultural differences.	.936
I can understand formal compliments and respond reasonably, such as "Your topic is very interesting." or "Thank you. I am glad you like it, but..."	.936
<b>Learning Engagement</b>	
Participate in an internship, co-op, field experience, student teaching, or clinical placement	.907
Asked questions or contributed to course discussions in other ways	.906
Hold a formal leadership role in a student organization or group	.906
Participate in a learning community or some other formal program where groups of students take two or more classes together	.904
Given a course presentation	.905
<b>Learning Performance</b>	
I enjoy learning about new topic	.906
I like to read diverse topic	.907
I prefer to see tangible output as a reward for my effort	.910
I find pleasure in learning I spend a lot of time thinking about my performance compared to others.	.906
I enjoy learning about new topic	.907
<b>Institution Support</b>	
Providing support to help students succeed academically	.935
Using learning support services (tutoring services, writing center, and other)	.935

Encouraging contact among students from different backgrounds.	.935
Providing opportunities to be involved socially	.934
Providing support for your overall well-being (recreation, health care, counseling and other)	.934

#### 4.2. Construct Validity Testing

In the correlation table 4, the significance of correlations is determined using p-values. This statistical analysis helps us assess the strength and reliability of the observed relationships between different constructs.

SRL is Self-regulated learning; AA is Academic Activity; LP is learning performance; STI is student-teacher interaction; TI is time investment; PI is peer interaction; IS is institution support; LE is learning engagement; PE is pragmatic Education; M is motivation.

For the Strong Positive Correlations, such as "SRL" with "AA" ( $r = 0.734^{**}$ ) and "SRL" with "LP" ( $r = 0.555^{**}$ ), these correlations are found to be highly significant at the 0.01 level (2-tailed). Similarly, when examining "STI" in relation to various other constructs like "SRL," "AA," and "PE," these correlations also exhibit high statistical significance at the 0.01 level (2-tailed).

In the case of Moderate Positive Correlations, like the one between "STI" and "PI" ( $r = 0.351^*$ ), these correlations are statistically significant but at a slightly less stringent level of significance, which is 0.05 (2-tailed). This level of significance applies to other moderate correlations involving constructs such as "PI," "Total\_TI," and "AA."

However, for the Weak Positive Correlations, including those between "SRL" and "TI," "PI," and "PE," as well as other weak correlations involving "TI," the p-values exceed the 0.05 significance level (2-tailed). This means that these weak correlations are not statistically significant, suggesting that there may not be meaningful relationships between those specific pairs of constructs.

Based on the provided correlation results and the principle that weak correlations lacking statistical significance may need further attention, here are some suggestions regarding which constructs may need refinement, adjustment, or exclusion:

##### 1. Refinement/Adjustment:

- **TI:** This construct shows weak correlations with several other constructs, and the correlations are not statistically significant. Consider reviewing and refining the items or variables within the "TI" construct to improve its relevance or clarity. It's possible that certain items within this construct may need adjustment or removal.

##### 2. Exclusion:

- **Weak Correlations with No Statistical Significance:** Examine the constructs that show weak correlations (both positive and negative) with no statistical significance ( $p > 0.05$ ). These may include "TI" with various other constructs as well as other weak correlations involving different constructs. Depending on the research goals and theoretical framework, you may consider excluding these constructs from your analysis if they do not contribute meaningfully to your study's objectives.

In summary, the strength of the correlations is indicated by the number of asterisks (\*\* for strong, \* for moderate), and their statistical significance is assessed based on the associated p-values. The significant correlations at the 0.01 and 0.05 levels (2-tailed) suggest meaningful relationships, while weak correlations with p-values above 0.05 lack statistical significance.

**Table 4:** Pearson Correlation of the Validity of Constructs.

		Correlations									
		TOTAL_SRL	TOTAL_STI	TOTAL_PI	TOTAL_TI	TOTAL_AA	TOTAL_PE	TOTAL_LE	TOTAL_LP	TOTAL_IS	TOTAL_M
TOTAL_SRL	Pearson Correlation	1	.698**	.361**	.029	.734**	.578**	.406**	.555**	.406**	.555**
	Sig. (2-tailed)		<.001	.009	.839	<.001	<.001	.003	<.001	.003	<.001
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_STI	Pearson Correlation	.698**	1	.351*	.248	.723**	.500**	.682**	.726**	.682**	.726**
	Sig. (2-tailed)	<.001		.012	.080	<.001	<.001	<.001	<.001	<.001	<.001
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_PI	Pearson Correlation	.361**	.351*	1	.186	.391**	.436**	.388**	.388**	.388**	.388**
	Sig. (2-tailed)	.009	.012		.190	.005	.001	.005	.005	.005	.005
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_TI	Pearson Correlation	.029	.248	.186	1	.278*	-.029	.240	.052	.240	.052
	Sig. (2-tailed)	.839	.080	.190		.048	.839	.090	.716	.090	.716
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_AA	Pearson Correlation	.734**	.723**	.391**	.278*	1	.636**	.572**	.566**	.572**	.566**
	Sig. (2-tailed)	<.001	<.001	.005	.048		<.001	<.001	<.001	<.001	<.001
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_PE	Pearson Correlation	.578**	.500**	.436**	-.029	.636**	1	.512**	.576**	.512**	.576**
	Sig. (2-tailed)	<.001	<.001	.001	.839	<.001		<.001	<.001	<.001	<.001
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_LE	Pearson Correlation	.406**	.682**	.388**	.240	.572**	.512**	1	.637**	1.000**	.637**
	Sig. (2-tailed)	.003	<.001	.005	.090	<.001	<.001		<.001	.000	<.001
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_LP	Pearson Correlation	.555**	.726**	.388**	.052	.566**	.576**	.637**	1	.637**	1.000**
	Sig. (2-tailed)	<.001	<.001	.005	.716	<.001	<.001	<.001		<.001	.000
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_IS	Pearson Correlation	.406**	.682**	.388**	.240	.572**	.512**	1.000**	.637**	1	.637**
	Sig. (2-tailed)	.003	<.001	.005	.090	<.001	<.001	.000	<.001		<.001
	N	51	51	51	51	51	51	51	51	51	51
TOTAL_M	Pearson Correlation	.555**	.726**	.388**	.052	.566**	.576**	.637**	1.000**	.637**	1
	Sig. (2-tailed)	<.001	<.001	.005	.716	<.001	<.001	<.001	.000	<.001	
	N	51	51	51	51	51	51	51	51	51	51

\*\* Correlation is significant at the 0.01 level (2-tailed).

\* Correlation is significant at the 0.05 level (2-tailed).

## 5. Discussion

Improving the measurement and research instruments in this study is essential to enhance the validity and reliability of the assessment tools. Researcher conduct the following steps to improve the research instruments.

To enhance the quality of our questionnaires, it is crucial to conduct multiple rounds of pilot testing. This iterative process allows us to pinpoint and rectify any issues related to clarity, inconsistencies, or ambiguities in the questions. Furthermore, it's essential to involve a diverse group of students in these pilot tests to ensure that the instruments are not only comprehensible but also relevant to our entire target population.

Seeking guidance from experts in educational research and measurement is paramount. Collaborating with experienced researchers and psychometricians will provide us with a comprehensive review of our questionnaires. Their expertise can help us identify areas that require improvement and validate the construct validity of our instruments.



To ensure the effectiveness of our questionnaires, we should conduct an item analysis. This analysis will allow us to scrutinize individual items within each questionnaire. By doing so, we can identify items that may not be contributing effectively to the measurement of our intended constructs. Items exhibiting weak psychometric properties should be either revised or removed.

Factor analysis is essential in assessing the factor structure of our questionnaires. Through this analysis, we can determine if the items align with the intended constructs or if there are any cross-loadings or mismatches. If necessary, we should adjust the questionnaire structure to ensure alignment.

To gauge the stability of our measurements over time, it's important to assess the test-retest reliability. Administering the questionnaires to the same group of students at two different time points will help identify any potential sources of variability and ensure the reliability of our instruments.

Our validation sample should be diverse and representative of the target population. Including students from various disciplines, academic levels, and demographic backgrounds will enhance the generalizability of our findings and improve the overall validity of the instruments.

Given the cultural diversity in Xi'an, it's prudent to consider cultural adaptation of our questionnaires. We must ensure that the language, context, and content are culturally sensitive and relevant to the local student population to maintain the validity of our measurements.

Incorporating additional validity checks, such as concurrent and criterion-related validity, is essential. These checks will assess how well our questionnaires correlate with established measures of learning engagement and academic performance, further validating our instruments.

The findings and insights from the pilot testing phase should be integrated into the final questionnaire design. Addressing any identified issues or concerns during pilot testing is essential to improve the overall quality of our instruments.

Implementing these recommendations will strengthen the measurement and research instruments, ensuring their suitability for future research in private colleges and universities in Xi'an, China. This rigorous approach will ultimately enhance the validity and reliability of our assessment tools, contributing to the quality of research in the field of learning engagement.

## **6. Conclusion**

The recommended areas for future research on this study on learning engagement in private colleges and universities in Xi'an, China are as below:

**Longitudinal Studies:** Conducting longitudinal studies [8] using the validated questionnaires can provide a deeper understanding of how learning engagement evolves over a student's academic journey. By tracking changes over time, researchers can identify patterns and factors that influence engagement. This can inform the

development of tailored interventions that consider the different stages of education, ensuring sustained engagement and academic success. Comparative Research: Extending the research to include comparative studies between private and public higher education institutions in Xi'an, China, is essential [9] (Saqr and his colleagues 2023). By comparing learning engagement in these two contexts, researchers can uncover unique challenges and opportunities in each setting. This comparative analysis can inform policy decisions that aim to improve the quality of education in both private and public institutions.

Cultural Considerations: Investigating the influence of cultural factors on learning engagement is crucial [10]. Given the diverse cultural backgrounds of students in Xi'an, researchers can use the validated tools to explore how cultural differences impact engagement. This research can provide valuable insights for educators and institutions, helping them create culturally responsive strategies to enhance engagement.

Intervention Strategies: Using the validated tools to design and assess the effectiveness of intervention strategies is a practical step [11]. Researchers can implement targeted programs aimed at enhancing learning engagement and use the questionnaires to measure their impact on student engagement and academic performance. This data-driven approach can guide the development of evidence-based interventions.

Feedback Mechanisms: Implementing a feedback mechanism using the validated questionnaires to gather input from students about their learning experiences is a continuous improvement strategy [11]. This feedback loop can help institutions refine their educational strategies based on real-time student input, enhancing engagement and satisfaction.

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