



# Sustainable Development and Higher Education Quality Assurance Factor Measurements and Structural Design

Tsatsral Tserendorj<sup>(✉)</sup>, Batdulam Sukhbaatar, and Soyolmaa Bavuudorj

Mongolian National Council For Education Accreditation, Ulaanbaatar, Mongolia  
Tsatsral@mncea.edu.mn

**Abstract.** Education is a key factor in achieving the goal of sustainable development, which is realized under the motto “NO-ONE LEFT BEHIND” around the world that the countries aiming to build a more stable society. Thus, the roles of education institutes are crucial, especially higher education institutions. Numerous attempts were made around the world to improve the quality of higher education including Mongolia where the quality assurance in higher education is positioned at the center of interests. In this study, we aimed to find higher education institutions’ factors that affect students’ overall competencies. For this purpose, a 6-criteria research questionnaire was used. We conducted a pilot study among 52 graduating students and survey score was 0.976. As a result of our study, 9 hypotheses have been accepted that learning process, practice, research, equipment in the training process, as well as equipment and practice in the research process have a positive impact on students’ overall competencies.

**Keywords:** Student · Comprehensive Competence · Employment Opportunities

## 1 Introduction

The Sustainable Development Agenda 2030 was first launched in 2012 at the United Nations Conference on Sustainable Development held in Rio de Janeiro.

The “Sustainable Development Goals”, which are the continuation of the “Millennium Development Goals” implemented until 2015, have been implemented since January 1, 2016 [9].

The Sustainable Development Goals 2030 is a global long-term policy document including 17 goals, 169 objectives and 244 indicators to achieve sustainable development based on three pillars: society, economy and environment. The fourth goal which focuses on to promote quality education by providing accessible, equitable, and quality education, and by enabling everyone to have access to lifelong learning [5].

Thus, education is a key factor in meeting these goals as it directly affects the development of a society and a country. Additionally, education is known as a main tool for overcoming inequality (lasting for generations) and is an initial term for sustainable economic development as well.

Education is the best investment for any nation to prosper and build a healthy and equitable society [2]. Hence, the educational service quality, which is a key factor in students' successful learning, needs to be improved. The goal of higher education institutions (HEIs) was to provide quality products and services meeting the students' needs and requirements. But today the process performance of creating those products and improving its efficiency and quality are becoming more serious. Graduates' employment and social security are key to building a sustainable society.

Therefore, the sustainable development goals can be achieved through quality education and the role of higher education institutions (HEIs) in creating and developing a sustainable society is significant [6]. In this sense, higher education institutions should focus on providing students with the skills required in the labor market and increasing their contribution opportunities to sustainable social development. In addition, by preparing graduates who are capable of earning a living and creating jobs for themselves, they should be considered important for ensuring social stability by having a job and income [1].

The quality of learning process, practical activities/practicum, infrastructure and equipment, and student research activities are considered to be major factors in higher education. In terms of sustainable development, higher education factors are essential in improving curricula where students can develop certain skills and increase their employment opportunities in the labor market [7]. Therefore, it is essential to examine how some factors in the HEIs affect students' overall competencies and their ability to find employment in the labor market after graduation [6].

In order to fill this gap, HEIs are required to prepare graduates who can meet the workplace requirements through their training programs implemented and develop above-mentioned quality assurance activities [3].

The European Higher Education Area Bucharest Declaration, developed as part of the Bologna Process, emphasizes the need for "meaningful assessment of learning outcomes in order to strengthen the European higher education framework." Assessment of learning outcomes has gradually become the focus of attention in European higher education in accordance with The Bologna Process so that it aimed to link learning outcome to both internal quality assurance and external quality assurance. Assessment of learning outcome is less focused in the education process, consequently, it provides a wide range of opportunities not only for the development and implementation of curricula, but also for the introduction of innovative teaching and learning methods [4].

Therefore, this study aimed to determine how the factors of higher education institutions (employment, learning process, equipment, knowledge and skills, comprehensive competencies, internships, research) affect the learning outcomes, comprehensive competencies of students and opportunities for employment in the labor market. For this purpose, we sought to answer the following questions.

1. How do employment, learning processes, equipment, knowledge and skills, comprehensive competencies, internships, and research affect students' complex competencies?
2. How does it affect employment, training processes, equipment, knowledge and skills, comprehensive competencies, internships, and research opportunities?

**Table 1.** Shows the factors and variables of higher education institutions

Factors	Variables	The value of the variable
Employment	3	Emp1-Emp3
Learning process	10	Cont1-Cont10
Infrastructure and equipment	4	TEq1-TEq4
Knowledge, skills and comprehensive competencies	6	Comp1-Comp6
Internship	5	Prct1-Prct5
Research work	6	Res1-Res9

**Table 2.** Questionnaire using a 1–5 point Likert scale

Evaluation amount	Understanding
1	I do not agree at all
2	Disagree
3	I doubt it
4	I agree
5	I completely agree

## 2 Methods and Materials

A total of 130 students from seven universities participated in the survey. To achieve our goal, we used a research questionnaire developed by Herlambang et al. (2021) [8].

The survey data was calculated using SPSS 25.0, Excel, and SmartPLS 3.3 programs and the results were summarized.

Data calculation was conducted using descriptive statistical analysis (distribution, mean, standard deviation, asymmetry coefficient, excess coefficients), inferential statistical analysis (correlation between questionnaire factors and reliability variables to test hypotheses) methods. The nine hypotheses were examined the factors of HEI affected for students' knowledge, skills, competencies, and employment opportunities. Table 1 shows the factors and variables of higher education institutions.

Data were collected from the students according to the 34 variables in the variable section of Table 1.

We developed a questionnaire using a 1–5 point Likert scale as shown in Table 2.

The selection was based on the total number of students in the program, the level of statistical probability, and the error limit. The sample size is determined using the following equation.

$$p = \frac{NZ^2p(1-p)}{(N-1) * E^2 + Z^2 * p(1-p)}$$

**Table 3.** Number of programs and participants in the pilot study

School name	Number of programs participated in the survey	Number of students participating in the survey
NUM	1	20
Etugen University	1	32

where: N – Senior students of state-owned enterprises,  $Z^2$  - Probability level t - statistical value, E - Error limit, p - Fixed value. The number of samples was taken with a probability level of 95%, a t value of 1.96 and an error limit of 5%.

We have stated and tested following hypotheses in four main categories.

**2.1 Infrastructure and Equipment**

Infrastructure, equipment, technology-based classrooms, laboratories and other facilities are essential for the learning process, practice and research activities.

Hypothesis 1 (H1). University infrastructure and equipment could have a positive impact on the learning process.

Hypothesis 2 (H2). University infrastructure and equipment could/would have a positive impact on practical activities.

Hypothesis 3 (H3). University infrastructure and equipment could have a positive impact on student research work.

**2.2 Learning Process**

Hypothesis 4 (H4). The university learning process has a positive impact on students’ overall competencies.

Hypothesis 5 (H5). The university learning process has a positive impact on student employment.

**2.3 Internship**

Hypothesis 6 (H6). Internships have a positive impact on students’ overall competencies.

Hypothesis 7 (H7). Internships have a positive impact on student employment.

**2.4 Academic Researches**

Hypothesis 8 (H8). Research activities have a positive impact on student.

Hypothesis 9 (H9). Research activities will have a positive impact on employment (Table 3).

The pilot study included senior students from the National University of Mongolia and Etugen University, and the baseline survey was conducted since the questionnaire reliability level was 0.976.

**Table 4.** Reliability statistics

Cronbach's Alpha	N of items
.976	34

**Table 5.** Results of descriptive statistical analysis on research factors

Factors	Average	Standard deviation	Asymmetry coefficient	Excess coefficient	Cronbach alpha coefficient
Employment	3.67	0.889	-0.909	1,353	0.812
Learning process	3.77	0.895	-1.247	1,650	0.966
Infrastructure and equipment	3.31	1,046	-0.625	-0.239	0.894
Knowledge, skills and comprehensive competencies	3.77	0.779	-1.436	3.110	0.926
Internship	3.66	1,037	-0.847	0.092	0.933
Research work	3.37	0.920	-0.471	0.058	0.929

### 3 Results and Discussion

Our results showed that the reliability analysis was Cronbach Alpha of 0.976 which indicates that the internal consistency between the questionnaire is very good and it can be adopted for the survey. The results of the study were discussed at the International Conference on “Quality Assurance in Higher Education” organized by the Mongolian National University of Education (Table 4).

#### 3.1 Reliability and Interpretive Statistical Analysis Results

There are several ways to analyze norm of data distribution (normal) and the most widely used methods are measuring asymmetry coefficients and extraction coefficients. In our study, the values found to be interval between  $[-2; +2]$ , normal distribution, and have possibility to test the hypothesis (Table 5).

Participants' results of rating on the employment of higher education institutions, learning process, infrastructure, equipment, knowledge and skills, comprehensive competencies, internships and research work ranged from 3.3 to 3.7, which indicates students' satisfaction level is medium, thus it needs to be improved).

**Table 6.** Correlation between variables

	Emp	Cont	TEq	Comp	Prct	Res
Emp	1					
Cont	.454 **	1				
TEq	.346 **	.711 **	1			
Comp	.349 **	.656 **	.576 **	1		
Prct	.422 **	.727 **	.675 **	.602 **	1	
Res	.452 **	.699 **	.691 **	.632 **	.760 **	1

**3.2 Results of the Variables Correlation Analysis**

A correlation analysis was performed to calculate the relationship between the factors of the HEinstitutions. The results of the correlation analysis between the quality assurance factors of higher education show the following results including: learning process is strongly correlated with infrastructure and equipment ( $r = 0.711, p < 0.01$ ), the learning process is strongly correlated with internship ( $r = 0.727, p < 0.01$ ), and the internship is strongly correlated to the research work which can be found in the following correlation coefficient (Table 6).

Since the factors of the HEinstitutions are interrelated (\*\*), it is viable to test the research hypotheses.

**3.3 Measurement of Factors and Structural Design Evaluation of Higher Education Quality Assurance**

In order to test the research hypotheses, we performed structural equation modeling and structural model analysis using SmartPLS3.3.3 to determine the relationship between factors. PLS-SEM is the main analytical method that allows estimation of relationships in variables and is commonly used in research to determine the customer satisfaction index.

Combination of assessment factors on HEinstitutions (quality of the learning process, infrastructure and technical equipment, practical activities, student research), students’ comprehensive competence and employment opportunities in the labor market gives that Cronbach’s alpha consistency (CR), and the mean variance (AVE) values are above the recommended threshold of 0.5, meeting all quality criteria.

The research model of correlation between a number of characteristics from the structural model analysis is illustrated in Fig. 1. The structural model shows that the impact on the learning process, internship and research work on students’ comprehensive competencies,  $R^2 = 0.501$ , impact of equipment on learning process is  $R^2 = 0.514$  and impact of internship on research work is  $R^2 = 0.480$ , which all have positive impact respectively.

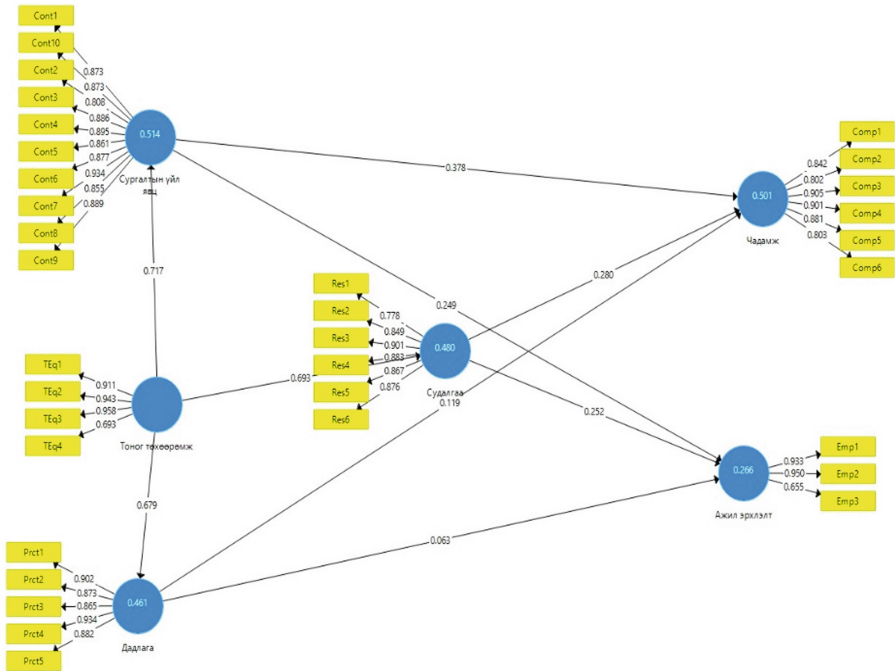


Fig. 1. Measurement and structural model evaluation

### 3.4 Checking Research Hypotheses

Hypothesis is the relationship between two different variables studied. In either case, a variable that is considered to affect or not affect the outcome is called an independent variable, whereas variable that is considered to be affected or rejected is a dependent variable. In order to determine which factors of HE institutions affect students' comprehensive competencies and employment opportunities in the labor market, we have proposed and tested 9 hypotheses.

However, since the chi-square test does not indicate how strong the correlation is, the Spearman correlation coefficient, showing the strength of the correlation of ordinal variables, is between 0.354 and 0.676, and all  $p$  (sig) = 0.000 > 0.05, which is less statistically significant.

## 4 Conclusion

We aimed to determine how factors in higher education institutions (employment, learning process, equipment, knowledge and skills, comprehensive competencies, internships, research) affect learning outcomes, students' comprehensive competencies, and employment opportunities in the labor market.

However, structural model showed that the impact of learning process, internship, research activities on students' comprehensive competencies, impact of equipment on

learning process and internship, and impact of internship on research activities are positive and the correlation analysis result indicated they have strong correlation.

**Acknowledgement.** We would like to express our deepest gratitude to the university administration and all the students who participated in the survey for accepting the request for cooperation.

## References

1. S.Batdulam, B. Soyolmaa, E. Boroldoi, O. Yanjmaa, B. Oyunchimeg, Students' views on quality assurance in higher education curricula. Education Accreditation, 2022.
2. Education quality reform policy 2012–2016
3. National Council for Education Accreditation. Internal quality assurance and employment . Bitpress, 2020.
4. National Council for Education Accreditation. A new era of quality assurance. Bitpress, 2022.
5. National Statistical Commission <https://sdg.1212.mn/Home/Detail?id=4>
6. National University of Mongolia. International ranking of universities and their influence on the ranking methodology, 2022.
7. A.A. Gora, S.C. Ştefan, Ş.C.Popa, & C.C.F. Albu, Students' Perspective on quality assurance in higher education in the context of sustainability: A PLS-SEM approach. Sustainability , 11 (17), 4793, 2019. DOI: <https://doi.org/10.3390/su11174793>
8. Herlambang, H. Amelia, DF, Amirual, M. Quality assurance for Sustainable Higher Education5 Structural Equation Modeling, 2021. DOI: <https://doi.org/10.3390/su13094954>
9. UNESCO. ESD for 2030 roadmap. 2021

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

