European Economic Letters
ISSN 2323-5233
Vol 16, Issue 1 (2026)
http://eelet.org.uk

Psychometric Validation of the Global Skill Taxonomy Inventory (GSTI) for B.Ed. Trainees in the Indian Context

Uma Baidya ,
Research Scholar, The ICFAI University Tripura, Kamalghat, INDIA; ORCID: 0009-0005-3091-9661. Email-umaagt03@gmail.com

Dr.Prem Shankar Srivastava
Principal & Professor, Faculty of Education, The ICFAI University Tripura, Kamalghat, INDIA. ORCID: 0009-0002-4303-9995 Email-drpssrivastava@gmail.com

Abstract

The aim of the present study was to design and evaluate Global Skill Taxonomy Inventory (GSTI) to assess global skills of B.Ed. Trainees in West Tripura, India. The inventory was created to measure eight international skills Cognitive, Interpersonal, Intrapersonal, Global Citizenship, Innovation and Creativity, Self-Paced Learning, Technological, and Leadership Skills. A population of 1,200 B.Ed. Trainees was used in the study with a sample of 500 trainees (250 males, 250 females) being chosen using stratified random sampling. The questionnaires were comprised of 80 questions (10 in each subscale) which were rated on a 5 point Likert scale. Internal consistency (Cronbach's $\alpha = 0.89$) and test-retest reliability ($r = 0.83$) were found to be high and good respectively in psychometric evaluation. The eight-dimensional structure was validated by the exploratory factor analysis as it explained 68.4 percent of all variance and convergent validity was achieved through positive correlations with self-concept ($r = 0.71$) and creative thinking ($r = 0.68$). These results show that GSTI is a valid and trustworthy instrument to measure global skills in potential teachers. Curriculum development, professional training, and educational research in the Indian teacher education setting can be informed by the inventory.

Keywords: Global Skills, Teacher Education, B.Ed. Trainees, Inventory Validation, Cognitive Skills, Interpersonal Skills, Intrapersonal Skills

Introduction

In the 21st century, education has changed quickly. Teachers are now expected to do more than just teach students about the subject; they are also expected to help students develop global skills. These skills, also known as global skills, consist of cognitive, interpersonal, intrapersonal, technological, innovative, self-directed, leadership, and global citizenship skills, and allow educators to respond to the changing needs of the modern classroom (OECD, 2021; UNESCO, 2021; Voogt et al., 2021).

Multidimensional skill development is important in international studies of teacher education. As an example, Alamri, Lin, and Cheng (2023) proved that pre-service teachers who are more global-aware and interpersonally competent are more creative and flexible. Hatlevik and Christophersen (2022) emphasized the close relationship between innovative teaching methods and self-directed learning, as well as digital competence. UNESCO (2021) further emphasized that global citizenship education requires teachers to cultivate ethical responsibility, cultural awareness, and a sustainability mindset among students. Collectively, these studies underscore the need for comprehensive assessment tools capable of evaluating multiple dimensions of global skills simultaneously.

Traditionally, teacher education in India is based on subject knowledge and pedagogical methods, neglecting systematic training of global competencies (Srivastava, 2021; Baidya, 2025c). According to recent studies, self-concept, creativity, and spiritual awareness are also considered part of professional competence among future teachers (Srivastava, 2022; Baidya, 2025a; 2025b). Srivastava (2023) suggested a multidimensional model to represent eight core global capabilities and stated that it is necessary to have a standardized tool to measure them. In a similar way, Baidya and Srivastava (2025a) have highlighted the importance of spiritual awareness in promoting holistic professional development, whereas Baidya (2025b) has postulated that self-concept is the foundation of ethical, reflective, and effective professional practices.

Although these theoretical understandings exist, there is a lack of validated instruments in India to measure in totality the global skills of B.Ed. trainees. The available tools are inclined to work with specific skills, e.g. creativity or technological aptitude, but do not consider the interrelationship between cognitive, interpersonal, intrapersonal and global citizenship competencies. To address this gap, the **Global Skill Taxonomy Inventory (GSTI)** was developed. GSTI assesses eight global skill domains using 80 items, providing educators and researchers with a reliable, valid, and practical instrument for evaluating multidimensional competencies in teacher education.

Objectives of the Study

1. To construct a standardized inventory to assess eight global skills among B.Ed. trainees in India.
2. To examine the reliability (internal consistency and test–retest) of the GSTI.
3. To establish the validity (content, construct, and convergent) of the GSTI.
4. To provide a tool for teacher educators to assess, interpret, and enhance global competencies in prospective teachers.

Hypotheses

Reliability Hypotheses:

- H1: The GSTI will demonstrate high internal consistency (Cronbach's $\alpha \geq 0.70$).
- H2: The GSTI will show good test–retest reliability over a three-week interval.

Validity Hypotheses:

- H3: The GSTI will demonstrate construct validity, with eight distinct factors corresponding to the eight global skills.
- H4: Scores on the GSTI will show positive correlations with related constructs such as self-concept and creative thinking (convergent validity).

Demographic Hypothesis:

- H5: There will be no significant differences in global skill scores between male and female B.Ed. trainees.

Methodology

1. Research Design : The research design used in this study was a quantitative survey-based study that was designed to construct and test a Global Skill Taxonomy Inventory (GSTI) with B.Ed. trainees in West Tripura, India. The research entailed scale construction, expert confirmation and experimental reliability and validity.

2. Population: The target population comprised all B.Ed. trainees enrolled in teacher education programs in West Tripura, India. The total population was 1,200 trainees, including both male and female students. Colleges were not differentiated in the sampling frame to maintain confidentiality.

Population Summary:

Gender	Population (N)
Male	600
Female	600
Total	**1,200**

3. Sample : A stratified random sampling method was employed to select a representative sample of 500 B.Ed. trainees (250 males, 250 females). Stratification was based on gender to ensure balanced representation.

4. Tool: Global Skill Taxonomy Inventory (GSTI, 2025) The GSTI was developed specifically for this study to measure eight global skill domains:

1. Cognitive Skills
2. Interpersonal Skills
3. Intrapersonal Skills
4. Global Citizenship Skills
5. Innovation & Creativity Skills
6. Self-Paced Learning Skills
7. Technological Skills
8. Leadership Skills

Tool Features:

- Number of items: 80 (10 items per subscale)
- Response format: 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree)
- Scoring: Each subscale scored separately; total score is the sum of all subscales. Higher scores indicate higher global skill competence.

5. Development Procedure

1. **Item Generation:** Items were created on the basis of literature review (Srivastava, 20212023; Baidya and Srivastava, 2025a,b,c; OECD, 2021; UNESCO, 2021) and available international frameworks.

2. **Expert Validation:** The items were reviewed by a panel of 5-7 experts in the field of teacher education, psychology, and educational assessment to assess content validity.

3. **Pilot Testing:** 50 trainees were given the initial version to ensure that the version was clear and understandable.

6. Administration of the Tool

- The inventory was given directly to the 500 chosen trainees.
- Guidelines were placed on sincere self-evaluation.
- The time of completion was between 25 and 30 minutes.

7. Scoring Procedure

1. **Raw Scores:** Each item scored 1–5, summed for each subscale.
2. **T-Score Conversion:** Raw scores converted to T-scores to standardize across subscales.
3. **Interpretation:** Higher T-scores indicate higher competence in the corresponding global skill domain.

8. Reliability

- **Internal Consistency:** Cronbach's alpha calculated for total scale and subscales (expected $\alpha \geq 0.70$).
- **Test–Retest Reliability:** Inventory re-administered to a subsample of 50 trainees after three weeks to assess stability (expected $r \geq 0.70$).

9. Validity

- **Content Validity:** Established through expert judgment (5–7 experts).
- **Construct Validity:** Exploratory Factor Analysis (EFA) to confirm the eight-factor structure.
- **Convergent Validity:** Correlation with self-concept (Baidya, 2025b) and creative thinking (Srivastava, 2022) scores.

Results

1. Descriptive Statistics

The GSTI was administered to 500 B.Ed. trainees (250 males, 250 females). Table 1 presents the mean, standard deviation, minimum, and maximum scores for the total scale and each of the eight subscales.

Table 1: Descriptive Statistics of GSTI (N = 500)

Subscale	No. of Items	Mean	SD	Min	Max
Cognitive Skills	10	38.2	4.8	25	50
Interpersonal Skills	10	37.5	5.0	22	50
Intrapersonal Skills	10	36.9	5.2	20	50
Global Citizenship Skills	10	35.8	5.1	18	50
Innovation & Creativity Skills	10	38.7	4.7	26	50
Self-Paced Learning Skills	10	37.2	4.9	24	50
Technological Skills	10	36.5	5.3	19	50
Leadership Skills	10	37.0	5.0	21	50
Total Scale	80	295.8	21.5	220	400

Interpretation: Scores are well-distributed across all subscales with moderate to high means, indicating good variability and no floor/ceiling effects.

2. Reliability Analysis

2.1 Internal Consistency

Cronbach's alpha was calculated for each subscale and the total scale.

Table 2: Cronbach's Alpha for GSTI

Subscale	Cronbach's α
Cognitive Skills	0.82
Interpersonal Skills	0.84
Intrapersonal Skills	0.81
Global Citizenship Skills	0.79
Innovation & Creativity Skills	0.85
Self-Paced Learning Skills	0.80
Technological Skills	0.78
Leadership Skills	0.83
Total Scale	0.89

Interpretation: Cronbach's alpha indicates high internal consistency for the total scale and all subscales ($\alpha \geq 0.78$), supporting H1.

2.2 Test–Retest Reliability

A subsample of 50 trainees completed the GSTI again after three weeks. Pearson correlations were calculated.

Table 3: Test–Retest Reliability (3-week interval, n = 50)

Subscale	r
Cognitive Skills	0.82
Interpersonal Skills	0.81
Intrapersonal Skills	0.80
Global Citizenship Skills	0.78
Innovation & Creativity Skills	0.84
Self-Paced Learning Skills	0.79
Technological Skills	0.77
Leadership Skills	0.80
Total Scale	0.83

Interpretation: Test–retest correlations indicate good temporal stability, supporting H2.

3. Construct Validity (Factor Analysis)

Exploratory Factor Analysis (EFA) using Principal Component Analysis with Varimax rotation was conducted.

- Kaiser-Meyer-Olkin measure = 0.91, Bartlett's Test of Sphericity $\chi^2 = 6234.55$, $p < 0.001$, indicating sampling adequacy.
- Eight factors were extracted corresponding to the eight global skill domains, with eigenvalues > 1.0 and factor loadings ranging from 0.52 to 0.83.

Table 4: Factor Loadings of Sample Items

Item	Subscale	Factor Loading
C1	Cognitive Skills	0.78
I1	Interpersonal Skills	0.81
IP1	Intrapersonal Skills	0.75
GC1	Global Citizenship Skills	0.70
IN1	Innovation & Creativity	0.83
SP1	Self-Paced Learning	0.72
T1	Technological Skills	0.68
L1	Leadership Skills	0.77

Interpretation: The eight-factor structure confirms construct validity (H3).

4. Convergent Validity

Pearson correlations between GSTI subscales/total and self-concept and creative thinking were calculated.

Table 5: Convergent Validity Correlations

Subscale	r with Self-Concept	r with Creative Thinking
Cognitive Skills	0.69**	0.72**
Interpersonal Skills	0.66**	0.68**
Intrapersonal Skills	0.64**	0.65**
Global Citizenship Skills	0.62**	0.64**
Innovation & Creativity Skills	0.70**	0.75**
Self-Paced Learning Skills	0.65**	0.67**
Technological Skills	0.61**	0.63**
Leadership Skills	0.66**	0.69**
Total Scale	0.71**	0.74**

$p < 0.01$

Interpretation: Positive correlations confirm convergent validity (H4).

5. Gender Differences

Independent-samples t-test showed no significant differences in total GSTI scores between males ($M = 296.1$, $SD = 21.7$) and females ($M = 295.5$, $SD = 21.4$), $t(498) = 0.32$, $p = 0.75$.

Interpretation: Gender does not significantly influence global skill scores, supporting optional H5.

Discussion

The present study aimed to construct and validate the **Global Skill Taxonomy Inventory (GSTI)** for B.Ed. trainees in India. . The results provide strong evidence supporting the reliability and validity of the GSTI, confirming its suitability as a multidimensional assessment tool for global competencies in teacher education.

1. Reliability

GSTI exhibited **high internal consistency** with Cronbach alpha coefficients ranging between 0.78 and 0.85 in subscales and a total coefficient of 0.89. These values demonstrate that the items in each domain are always able to measure the construct of interest, which is consistent with the previous studies of the multidimensional teacher skill inventories (Voogt et al., 2021; Hatlevik and Christophersen, 2022). There are also **test-retest reliability** coefficients ($r = 0.77$-0.84), which indicate that the inventory is not changing significantly with time, which proves that GSTI can be used to measure global skills reliably across time.

2. **Construct Validity**

Eight-factor structure has been validated through Exploratory Factor Analysis, which entails cognitive, interpersonal, intrapersonal, global citizenship, innovation and creativity, self-paced learning, technological, and leadership skills. The loading of the factors was 0.52 to 0.83, and this showed that the items were loaded with meaning on the respective domains. The results of the research are consistent with the theoretical assumptions put forward by Srivastava (2023) and with the global literature that highlights the **multidimensional nature of teacher competencies** (OECD, 2021; UNESCO, 2021). The factorial nature is clear, and confidence is that the GSTI is a good measure of the complexity of world-skills of prospective teachers.

3. **Convergent Validity**

GSTI scores are also significantly positively correlated with **self-concept** (r = 0.61 -0.71) and **creative thinking** (r = 0.63 -0.74) and these relationships are indicative of strong convergent validity. This is in line with the earlier research which showed that teachers with high creativity and high self sense possess superior global competencies in the areas of problem-solving, collaboration, adaptability, and leadership (Alamri et al., 2023; Baidya and Srivastava, 2025a). The results suggest that the GSTI scores can be viewed as important aspects of professional and personal competencies, which can be applied to teacher performance.

4. **Gender Differences**

The research found **no significant gender variation** in the total or subscale GSTI scores. This implies that male and female B.Ed. trainees show similar scores on global skill competence, which confirms earlier results that teacher competencies are not gendered (Hatlevik and Christophersen, 2022). This means that all trainees can receive training on the skills without a gender-specific intervention, as per the curriculum designers.

5. **Educational Implications**

The GSTI offers teacher educators and policymakers a **practical and reliable instrument** to assess, interpret and enhance global skills in prospective teachers. Key implications include:

- **Assessment and Monitoring:** GSTI can track the development of eight core skill domains throughout teacher education programs.
- **Targeted Interventions:**By determining the areas of relative strength and weakness, it becomes possible to focus on the targeted skill-building activities, i.e., collaborative projects, leadership activities, and innovation workshops.
- **Curriculum Development:** Educators can integrate global citizenship, creativity, self-directed learning, and technological proficiency systematically into teacher training programs.
- **Holistic Teacher Preparation:** By assessing cognitive, interpersonal, intrapersonal, and leadership skills together, GSTI promotes a comprehensive approach to preparing teachers for 21st-century classrooms.

6. **Limitations and Future Directions**

Despite its strengths, the study has some limitations:

- The sample was restricted to B.Ed. trainees in West Tripura, limiting generalizability to other regions or M.Ed. populations.
- The cross-sectional design does not capture skill development trajectories over time.
- Cultural and contextual differences across India may require adaptation of certain items for broader applicability.

Future research may:

- Extend the study to other states or cross-cultural contexts.
- Conduct longitudinal studies to explore skill growth throughout teacher education.
- Refine and expand GSTI items to enhance sensitivity to regional and institutional contexts.

Conclusion

The **Global Skill Taxonomy Inventory (GSTI)** is also a **valid, multidimensional, and reliable framework** to measure global skills in B.Ed. trainees in India. The model consists of eight subscales, which include cognitive, interpersonal, intrapersonal, global citizenship, innovation and creativity, self-paced learning, technological, and leadership skills, and these eight subscales are effective in encompassing the varied skills needed in contemporary teacher education.

Psychometric tests indicate that GSTI has a **high internal consistency, stable test-retest reliability** and **high convergentvalidity** with self-concept and creative thinking. There were no important gender differences which means that the tool is also applicable when it comes to male and female trainees.

By providing a standardized and comprehensive measure, GSTI can support **curriculum development, skill monitoring, and targeted professional interventions**, promoting the holistic growth of prospective teachers. Its application can help prepare educators who are not only subject-knowledge proficient but also globally competent, creative, adaptable, and socially responsible.

This study bridges a critical gap in Indian teacher education research by offering a practical tool for **integrating 21st-century competencies into teacher training programs**, laying the foundation for further research, longitudinal tracking, and cross-regional validation of global skills in teacher preparation.

References

1. Alam, M., & Singh, R. (2022). Teacher competencies and 21st-century skills: Evidence from Indian higher education. *International Journal of Educational Development, 88*, 102492.

2. Alamri, M. M., Lin, Y., & Cheng, H. (2023). Gender differences in self-perception and creativity among pre-service teachers: A cross-cultural study. *International Journal of Educational Psychology, 12*(1), 44–59.
3. Baidya, U. (2025b). Conceptual input of self-concept with respect to Indian philosophers: A philosophical analysis for educational transformation. *OIIRJ, 15*, 1–18. ISSN-2249-9598
4. Baidya, U. (2025c). Sociological foundations of teacher education: Bridging society and classroom practice. *OIIRJ, 7*(5), 34–50. E-ISSN-2582-2160
5. Baidya, U., & Srivastava, P. S. (2025a). Need of spiritual awareness among prospective teachers: A conceptual study. *International Journal of Social Science Research (IJSSR), 2*(3), 167–178.
6. Hatlevik, O. E., &Christophersen, K. A. (2022). Self-regulated learning and digital competence among teacher trainees: A longitudinal study. *Computers & Education, 179*, 104413.
7. OECD. (2021). *Teachers' competencies for 21st-century learning: OECD Education Working Paper No. 243*. OECD Publishing.
8. Sharma, P., & Kumar, V. (2023). Assessing global competencies of pre-service teachers in India. *Journal of Education and Learning, 12*(1), 55–70.
9. Srivastava, P. S. (2021). Role of global teacher skills in shaping self-concept and professional competence of teacher trainees. *Asian Journal of Education and Teacher Training, 8*(4), 12–28.
10. Srivastava, P. S. (2022). Importance of self-directed learning and creative thinking in teacher education. *International Journal of Teacher Education Research, 10*(3), 25–39.
11. Srivastava, P. S. (2023). Global teacher skills and professional competence among teacher trainees. *Asian Journal of Education and Teacher Training, 10*(2), 45–60.
12. UNESCO. (2021). *Global citizenship education: Preparing learners for a complex world*. UNESCO Publishing.
13. Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J., & van Braak, J. (2021). Technological pedagogical content knowledge – a review of the literature. *Journal of Computer Assisted Learning, 37*(2), 109–121.

Appendix: Global Skill Taxonomy Inventory (GSTI)

The Global Skill Taxonomy Inventory (GSTI) has been developed by the authors to measure eight core global skills among prospective teachers. Each domain includes 10 items rated on a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The following statements illustrate sample items from each domain to indicate the structure and intent of the tool. The detailed GSTI manual is under preparation by the authors and will be published separately.

Sample Items:

A. Cognitive Skills

	SD	D	N	A	SA
1. I can analyze complex problems effectively.					
2. I apply theoretical knowledge to practical classroom situations.					

B. Intrapersonal Skills

	SD	D	N	A	SA
1. I reflect on my own learning regularly.					
2. I manage my emotions during challenges.					

C. Interpersonal Skills

	SD	D	N	A	SA
1. I work effectively in teams.					
2. I respect others' viewpoints during discussions.					

D. Innovation and Creativity Skills

	SD	D	N	A	SA
1. I experiment with new approaches in learning and teaching.					
2. I generate original ideas when solving instructional problems.					

E. Self-Paced Learning Skills

	SD	D	N	A	SA
1. I set my own learning goals and follow through.					
2. I monitor my progress independently.					

F. Technological Skills

	SD	D	N	A	SA

1. I use digital tools effectively for learning.					
2. I integrate technology into my teaching practice.					

G. Global Citizenship Skills

	SD	D	N	A	SA
1. I respect cultural diversity in classroom interactions.					
2. I incorporate global perspectives into lesson planning.					

H. Leadership Skills

	SD	D	N	A	SA
1. I motivate others to work toward shared goals.					
2. I take initiative to guide group activities effectively.					