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KEYWORDS	ABSTRACT
Scenarios, Scenario-Based Assessment, Formative Assessment, Active engagement, Analytical thinking, Research-oriented thinking, Teacher Education	The current paper describes the way a scenario-based assessment was chosen and created. It also covers the reviews by experts. How well it worked with students. This type of assessment is one way to help students learn better during their B.Ed. (Hons.) course "Research Methods in Education". The paper focuses on the steps taken of just the end result for a scenario-based assessment. It shows how a set of tasks that were meant to check learning was made and used in the classroom. Based on what has been written about scenario-based learning and checking four steps are explained. These steps are connected to each other: choosing scenarios validating the scenarios using the scenarios for intervention and thinking about the contextual use. Seven ideas were generated from classroom situations. These tasks were looked at. Checked carefully by a group of three experts from two public teaching universities of Pakistan. The experts said the tasks were good in terms of what they covered how relevant they were and how easy they would be to use in teacher training classes. This made the set of scenarios ready for the next step. The paper shows, by looking at one study that's part of a bigger study for a doctorate how a thesis has many parts that each look at different stages of the research process for new PhD students. The effects, on how much students paid attention and how well they thought critically are not talked about here. These will be covered in parts of the doctorate work when the approach is used.
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Introduction

The current study records the systematic execution of seven SBA tasks in combination with self-reflection prompts that are oriented towards boosting SE and CT, as well as developing research

skills. This paper is dedicated to such practice as scenario-based assessment (SBA) selection and validation. The scenario-based method replicates real teaching and research experiences allowing students to be actively involved in problem-solving and critical thinking (Iqbal and Every, 2005; Hilton, 2003). The current article presents the design and expert-validation step of SBA implementation and thus it is presented as one of the base steps in the overall doctoral research process.

Background

The increased focus on twenty-first century skills, especially student engagement (SE) and critical thinking (CT) has redefined the assessment practices in teacher education. Traditional assessment practices, specifically in B.Ed. (Hons.) programs, are sometimes found challenging to assess the competencies of teaching and research that the future teacher needs to demonstrate. Students learning remain insufficiently assessed during instruction and teachers and students do not able to know the extent of attained course knowledge. Specifically, research content/topics application or use in real life such as during practicum in the end of semester or respond to scenarios used in assessments during examinations. This research fills this gap by using scenario-based assessment (SBA) as a formative assessment strategy in a Research Methods in Education course. Scenario based methods place the learner in a real life setting that is context based and involves analysis, decision making and reflection (Iqbal & Every, 2005; Hilton, 2003). Together with structured self-reflection they provide a strong tool to build up higher order thinking and long-term engagement.

Aim of the Study

This study is part of a doctoral research project that looks at formative assessment methods in teacher education. The main goal of this study is to design and test a scenario-based assessment that includes self-reflection (Pair B) as an assessment tool for the Research Methods in Education course.

Scope of the Study

This article does not cover formative assessment strategies such as justification-based assessment or peer-assessment. These are being studied separately within the doctoral research. The impact of these verified assessment tasks, on student engagement (SE) and critical thinking (CT) will be explored during the implementation phase of the study and is not included here.

Literature Review

Context of Scenario-Based Assessment

The teaching of scenarios unites learning and evaluation to real-life situations, which encourages the practice of knowledge and reflections (Iqbal and Every, 2005). Hilton (2003) notes that scenarios create experiential learning, whereas Pedro et al. (2019) point to their use in fostering better engagement with the help of structured learning designs. Scenario-based assessment (SBA) was demonstrated to facilitate higher-order thinking by placing learners in contexts of meaningful

problems (Zhang et al., 2019). Moreover, combining SBA and reflective elements can be associated with the principles of formative assessment, which promotes the development of metacognition (Black and Wiliam, 2009).

Student engagement (SE) and critical thinking (CT) are the two developmental areas of 21-st century learning models (Trilling and Fadel, 2009; Binkley et al., 2012). Scenario-based strategies have a natural inclination to embrace these skills since they require active engagement, analysis, and evaluation.

Notably, the validity and credibility of scenarios can be guaranteed through strict expert certification that they are aligned to teaching practices in the real world and the standards of the academic world (Merseth, 1996; Shulman, 1992). The recent research by Saeedian and Ghaderi (2023) also highlights the significance of situational based scenarios to formulate pedagogical reasoning.

SBA in Teacher Education

Scenario based assessment is an evaluation of the capacity by the learners to use the knowledge in real contexts (Zhang et al., 2019). It is compatible with constructivist and competency-based learning models, which focus on application rather than on rote learning.

Iqbal and Every (2005) point out that teaching, learning, and assessment are combined in the form of scenarios, whereas Hilton (2003) accentuates their importance in experiential learning. Pedro et al. (2019) also show that the structured learning situations increase the engagement and effectiveness of instruction.

This paper presents a small part of doctoral research that examines the design and validation of a scenario-based formative assessment (SBA) in a B.Ed. (Hons.) course. In particular, the research focuses on the creation and professional validation of 14 real teaching scenarios each of which is accompanied by a set of self-reflection prompts (Pair B), and the intention to improve student engagement (SE) and critical thinking (CT) as the 21-st-century competencies. The research builds on the literature of scenario-based learning and assessment by describing the systematic procedure of the selection and contextualization of scenarios and their validation by experts. The results confirm the validity and pedagogical usefulness of the constructed scenarios and the compatibility of SBA and reflective formative assessment activities. The research provides a tested framework on how to select scenarios and empowers research on teacher education studies with an empirical basis of integrating SBA and self-reflection.

Formative Assessment and Ongoing Learning

Formative assessment helps to maintain the learning process by offering continuous feedback and improvement (Black and Wiliam, 2009). The integration of SBA in other three formative assessment practices facilitate learning through iteration and closer engagement of the mind.

Twenty-First Century Skills

Student engagement entails behavioral, emotional and cognitive engagement in the learning process (Fredricks et al., 2004). Critical thinking can be defined as a skill to analyze, evaluate, and make justified conclusions (Facione, 2015). Scenario-based assessments encourage inherently SE by engaging in realistic activities and CT by examining difficult situations during teaching practice. Moreover, these are core competencies of contemporary education (Trilling & Fadel, 2009; Binkley et al., 2012).

Authenticity and Validation of Course-Based Teaching Scenarios

The authenticity and validity of scenarios determine the credibility of SBA. Saeedian and Ghaderi (2023) outline the significance of situations with context in the development of pedagogical reasoning. One of the important processes in maintaining relevance, clarity and focus of content to learning goals is expert validation (Merseth, 1996; Shulman, 1992).

Methodology

Research Objectives

1. To create a set of scenario-based assessment tasks that match the content taught in the Research Methods in Education course.
2. To finalize the set of scenarios with input from experts making sure the teaching situations in the tasks reflect real classroom experiences accurately.
3. To gather evidence about the content validity, relevance and how practical it is to use the set of scenario-based tasks, based on expert evaluations.
4. To examine how using scenario-based assessment combined with self-reflection (Pair B) can support classroom assessment practices and help improve learning in a way.

Research Design

The research proposed is a design based qualitative study (Reeves & McKenney, 2015; McKenney & Reeves, 2013) that aims at developing and testing scenario based formative assessment as part of a broader research study at doctoral level.

Current study follows design-based qualitative research (DBR) method (Scott, Wenderoth & Doherty, 2020) aims to develop, select and validate scenarios based on teaching practicum of prospective teachers. The DBR research approach is significantly useful in combining theoretical implications and research-based interventions in education field (Anderson & Shattuck, 2012). The difference between purely descriptive qualitative designs and DBR is that the researcher can have the opportunity to develop the theoretical underpinning of how scenario-based assessment works in teacher education and create an instructional tool that is contextually validated (Creswell & Creswell, 2017). The participants/experts were selected through purposive sampling who have more than 5-year experience in public teaching universities in Punjab Pakistan.

Each scenario was taken from a problem/dilemma that needed analytical thinking and reflective engagement and a variety of decision making, justification and self-reflection questions were included in all scenarios. In the formative assessment framework (Pair), the scenarios were matched with scenario-based assessment (SBA) and self-reflection (SR) as suggested by Zimmerman et al., (2002; 2011) and Nicol & Macfarlane-Dick (2006) since they argued that self-oriented metacognitive processes and cognitive processes are best stimulated when authentic problems are coupled with structured self-evaluation. At the end of every scenario, participants/experts were invited to talk about their reaction, the way they were thinking, and how they were relating the themes of the course and their own experiences in teaching. The relevance between the content of scenarios and the reflective practice is of the type, which follows the principles of formative assessment as described by Black & Wiliam (1998, 2009) in various studies on classroom instruction and assessment.

The scenarios were based on fourteen topics of selected course of “Research Methods in Education” (Ahsan & Qaiser, 2026) in B.Ed. Honors program in Punjab Pakistan. These scenarios were further used as a pair with self-reflection strategies during the instruction of that course solely for intervention purpose.

Scenario pool/Development of Scenarios

Scenario pool is developed as follows: A set of situations was generated initially, on the basis of “Real teaching practice experiences of future teachers”, “Ordinary dilemmas of educational research (e.g., inquiry in classrooms, interpretation of data, ethical issues)” and “Learning outcomes of the Research Methods in Education course”. Out of this, fourteen scenarios were picked to capture a balanced set of teaching and research situations. They were developed on the basis of practices of the future teachers in real-life teaching, typical issues in the research of education and learning outcomes. Each situation was designed to involve an issue or dilemma that needs to be decided upon, analytical and reflective prompts combining with Self-Reflection (in a Pair).

There were fourteen scenarios developed with the help of literature review (Kane, 2012) and findings of teaching training issues in Pakistan by Siddiqui (2021). The seven areas of classroom-based teaching issues following seven research topics from the “Research Methods in Education Course” were generated at initial phase. At the final phase, seven scenarios were selected through expert validation to use in a broader research study.

Scenario Adaptation Sources

Authentic assessment has positive effect on learning such as real classroom-based scenario and practice based educational tasks. The scenario adaptation and development have made by using different sources like Gulikers et al., (2004) two studies a five-dimensional framework and perceptions of authentic assessment. These studies guided to choose daily classrooms ‘common challenges like classroom management issues. The second resource was Kane (2006) study which focused construct-relevant tasks that encourage reasoning and justification to assess both SE and

CT. The third resource was UNESCO and British Council Pakistan resources on teaching dilemmas material guide to create scenarios.

Study considered specifically, “Teaching in Pakistan, Challenges and Responses” that represents real teaching dilemmas faced by educators in Pakistan like language barriers, cultural conflicts, assessment and gender roles as a source. After the exposure with given scenario participants Justify their responses, consider their reasoning and relate theory and practice. This one-to-one association is in accordance with the principles of formative assessment and promotes more profound thinking. Current study selected scenarios, localized it and made relevant by expert validation. The scenarios validated by experienced educational experts including subject specialist before final data collection.

Design of Selected Scenarios

In teacher education programs performance-based assessments or activities are significant to foster students' learning engagement and higher-order thinking (Phelps et al., 2023). The use of scenario-based assessment is one of the performance tasks selected to attain the research purpose. In selected scenarios each had:

- An authentic and contextual situation
- A very specific issue or dilemma
- Queries that need analysis, decision making and justification.
- The situations were pre-planned to provoke engagement (SE) and critical thinking (CT).

How Seven Scenarios Were Selected

A critical methodological step in this study was narrowing the fourteen developed scenarios down to seven for the SBA component specifically paired with Self-Reflection (Pair B). This selection and finalization process followed a rigorous set of criteria guided by the literature on scenario-based assessment development (Almazova et al., 2021; Brookhart, 2024).

Step 1 mapping: The relevance of fourteen scenarios was ensured to attain the desired outcomes of research course as well as study objectives. The alignment of content with the scenarios was confirmed by experts to avoid reoccurrence of situations in SBA practice.

Step 2 classification: The scenarios were sorted in research topics included in research methods course and teaching dilemmas might appeared during practicum with prospective teachers in public universities. The classification of scenarios into research topics and teaching dilemmas were fairly represented the research purpose in SBA practice.

Step 3 Cognitive demand screening: Each of the seven scenarios were reviewed multiple times by local experts to confirm their relevance to five dimensions of critical thinking (analysis/evaluation; explanation; justification; reasoning; self-regulation) and three of learning engagement (behavioral;

emotional–cognitive; social). All the dimensions were included in two scales of critical thinking and engagement (Rodriguez et al., 2024; Heilporn et al., 2024) in the study.

Step 4 Expert validation: Each of the three experts evaluated seven scenarios on established criteria of relevance; authenticity; cognitive demand; learning engagement and clarity. According to Polit and Beck (2006) and Lynn (1986) the scores of 0.78 for content validity index (CVI) are acceptable for scenario-based assessments and the panel approved that score too.

Step 5 selection of seven scenarios for Pair B: From the validated set seven scenarios were carefully chosen for the SBA + SR pairing. These scenarios stood out because they best supported self-reflection. They required participants to not analyze a realistic dilemma but also reflect on their own reasoning identify where their understanding was weak and explain how their thinking had evolved.

A Design-Based Research approach was used to refine the scenario-based assessment tasks. This was to enable prospective teachers who were taking the course on Research Methods in Education to do assessment tasks. Fourteen ideas for scenarios were developed at the beginning. These were developed in the content of the course and real situations in research. After reviewing them seven of these ideas were chosen for the assessment design. The finalized ideas for scenarios address research contexts and research methods that are representative of the work and practicum experiences of prospective teachers. Finalized seven scenarios are presented in below table:

Table1: Seven Scenarios and Seven Research Topics

Topic	Scenario
1. Descriptive Research Method in Education	1. Investigating Students Study Habits in first year of B.Ed. Honors
2. Experimental Research Methods in Education	2. Practicum-Based Research Task
3. Formulation of Hypothesis	3. Improving Homework Submission Rates
4. Quantitative Case Study	4. Measuring the Impact of a New Teaching Strategy
5. Grounded Theory	5. Exploring How Student Teachers Develop Classroom Confidence
6. Data Collection & Data Analysis	6. Conducting a Group Activity in Classroom During Practicum
7. Phenomenology Research Method in Education	7. Collecting and Analyzing Subjective Realities/Perspective

The above table presented seven teaching situations which were sorted through seven research topics by prospective teachers when used in research intervention. experts confirmed that the

scenarios have potential to activate participants' learning engagement and critical thinking. Moreover, scenarios are aligned with the research topics of course for an assessment pair in a broader research study.

Process of Expert Validation

The chosen scenarios were systematically checked by the panel of teacher educators working in the public universities in Punjab Pakistan. The following criteria were followed during the validation process:

- **Authentication:** Select real life situations for scenarios in research course
- **Relevance:** Coherence with course goals and research topic
- **Cognitive Demand:** Potential to promote critical thinking
- **Engagement Potential:** Ability to promote active student engagement
- **Clarity:** Correction and understandability of scenario structure

Doctoral-level rigor and validity were ensured by expert feedback to refine the scenarios to meet the criteria. The validation process of scenarios' contents specifically aligned with the established criteria for educational intervention.

Analysis and Findings

The findings are presented into two parts:

The Finalized Scenario-Based Assessment Design

The scenario-based assessment tasks were created using a Research approach. This combines tool making with critical examination of the effectiveness and utilization of tools. The results in this cycle are presented in two parts, which complement each other; the development of the assessment design, and the expert review of the design. The first part displays the assessment as it is following changes. The second part illustrates the evaluation of the quality made by experts before it was introduced into classrooms.

The assessment design has been improved, changing from fourteen scenarios to seven. The initial brainstorming of scenario ideas was obtained from the topics that were covered in the Research Methods in Education course and through research scenarios that are relevant to prospective teachers. Experts visited the pool and seven scenarios were retained for the design of the pool assessment. Criteria for deciding whether to include each scenario were twofold: how representative each scenario was of the intended course content and how much it provided a context for real use of research-method concepts rather than merely recall.

To ensure a variety of quantitative, qualitative and mixed methods, the seven scenarios were constructed. All scenarios were presented in a familiar classroom/practicum context to prospective teachers.

There were four scenarios for the quantitative strand.

In the first scenario the study habits of first year B.Ed. students were explored. It employed questionnaires and observation. It has been directed at research, in which no variables have been changed.

The second one involved comparing activity-based grammar instruction to grammar instruction. It used two groups. Compared their outcomes. It applied logic.

The third scenario was related to the correlation between teacher feedback and homework turnover. It asked the participants to write hypotheses and identify variables.

A case-study was used in the fourth scenario. It assessed whether or not activity-based teaching enhanced the performance of Grade 8 science students over lecture-based teaching. It was directed towards the case, variables and the numeric data collected.

For the qualitative strand there were two scenarios with an additional scenario combining the two traditions.

The grounded scenario was that of the student teachers' classroom confidence building. It needed interpretation of data from the interview, notes from observation and reflections after the lesson. Prospective patterns and a new theory could be developed.

The phenomenological scenario was about the first experience of pre-service teachers' teaching practice. The methodology employed was in-depth interviews, written reflections and classroom observation. It sought statements, common themes and the essence of the experience.

In the last scenario, qualitative approaches were used. It analyzed students' involvement during a group activity. It requested both statistical and thematic analysis of the observation notes and interviews and a combination of both in the conclusion.

For each of the scenarios, all teachers were asked to consider educational problems, and develop or identify a research design, data sources and methods for each of the situations. This provided a practical assessment based on an application of the knowledge instead of only recalling the terms.

Experts Validation Ratings

For determining the quality of the retained scenarios, three experts rated them against three criteria: content validity, relevance, contextual feasibility/usability. All ratings are shown in Table 2.

Table 2: Expert validation ratings of the scenario-based assessment tasks

Criterion	Expert 1	Expert 2	Expert 3	Mean
Content validity	0.74	0.73	0.76	0.74

Relevance	0.75	0.74	0.75	0.75
Contextual feasibility/usability	0.76	0.75	0.75	0.75

The average content validity score was 0.74 (< 0.75 – the cut-off level for the study). The average relevance and contextual feasibility/usability scores were close to 0.75. These numbers are displayed in a distinct manner. The result of the validation may be to, but not exceeding, the pre-defined benchmark. Therefore, the ratings indicate that the content is acceptable, and scenarios are relevant. The work is hands on. They do not demonstrate the effectiveness of tasks.

Synthesis: Implications for the DBR Cycle

The expert validation stage was used as a check and decision point in the DBR process. Before the scenarios were taken to the classroom, the initial set was treated as an "expert product" for which expert judgment was employed. The final seven scenarios have been kept after the validation data and a review of the content of the scenarios against the course material.

Together the two sets of results support moving to the implementation stage. The scenarios provide a way to cover the course content covering quantitative, qualitative and mixed methods. Experts say that the scenarios are pertinent and applicable in classrooms. The results of this cycle are similar to that found in any design cycle, in that the materials are suitable but their effects are not revealed. It will be determined during implementation and outcome measurement whether the tasks increase teachers' engagement or critical thinking.

Discussion on the Validation Process

The evidence from the expert review of the scenario-based assessment tasks for the Research Methods in Education course was relevant, with good content validity and was a good reflection of the final design being realistic. The review process began with a group of fourteen ideas for scenarios and ended with the retention of seven scenarios that local experts believed were suitable to the material presented in the course and the needs of twenty century education. The experts also noted that the assessment becomes more valuable in learning rather than just measuring knowledge if it is accompanied by scenario-based assessment and self-reflection. The set of scenarios provides a realistic foundation for the larger doctoral study because the group that reviewed the scenarios consisted of experts of the teacher-education context. The review also revealed that the scenarios used are real and true, meaning that the tasks have the potential to engage students and afford them opportunities for deep thinking when implemented in the classroom. But this is yet to be established in research. The validation results indicate that the materials are suitable to use but their effect on engagement and thinking will be assessed during the use stage.

Conclusion

In the present study, a set of scenario-based assessment tasks for a B.Ed. Honors course was developed using the expert review. A team of fourteen scenario plan ideas was improved. Identify

seven scenarios. The expert group determined that these seven were real, important and helpful to teachers. The scenarios are now ready to meet the learning needs of the course. Encourage students to be engaged and to think more deeply when used in practice. The design combines scenario-based assessment with self-reflection, which enable teachers to apply assessment strategies in their teacher education classes. The overall result of the work is an addition to important methods of quality assurance and improvement in doctoral studies, as well as in teacher education that is relevant to real-life contexts.

References

- Ahsan, S., & Qaiser, S. (2026). Course Selection for PhD Intervention in Teacher Education: Expert Validation of B. Ed. Courses for Enhancing 21st Century Competencies in Pakistani Public Universities. *ProScholar Insights*, 5(1), 238-245.
- Almazova, N., Rubtsova, A., Kats, N., Eremin, Y., & Smolskaia, N. (2021). Scenario-based instruction: The case of foreign language training at multidisciplinary university. *Education Sciences*, 11(5), 227.
- Anderson, T., & Shattuck, J. (2012). Design-based research: A decade of progress in education research? *Educational researcher*, 41(1), 16-25.
- BAIG, M. N. NEP 2020: CURRENT TRENDS AND FUTURE PROSPECTS: CRITICAL THINKING DEVELOPMENT. *Current Trends and Future Prospects*, 27.
- Bala, I., Kaur, K., & Dhiman, T. (2025). Revolutionizing Classroom Learning through NEP 2020: Bridging Policy and Practice in Modern Education. *Int J Contemp Res Multidiscip*, 4(4), 265-274.
- Binkley, M., et al. (2012). *Defining twenty-first century skills*.
- Black, P., & Wiliam, D. (2009). Developing the theory of formative assessment. *Educational Assessment, Evaluation and Accountability*, 21(1), 5-31. <https://doi.org/10.1007/s11092-008-9068-7>
- Black, P., Harrison, C., & Lee, C. (2003). *Assessment for learning: Putting it into practice*. McGraw-Hill Education (UK).
- Brookhart, S. M. (2024). Educational assessment knowledge and skills for teachers revisited. *Education Sciences*, 14(7), 751. <https://doi.org/10.3390/educsci14070751>
- Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Sage.
- Errington, E. P. (2011). Mission possible: Using near-world scenarios to prepare graduates for the professions. *International Journal of Teaching and Learning in Higher Education*, 23(1), 84-91.
- Gulikers, J. T., Bastiaens, T. J., & Kirschner, P. A. (2004). A five-dimensional framework for authentic assessment. *Educational technology research and development*, 52(3), 67-86.

- Gulikers, J. T., Bastiaens, T. J., Kirschner, P. A., Gulikers, J., Bastiaens, T., & Kirschner, P. (2004). Perceptions of authentic assessment. In *Second Biannual Joint Northumbria/EARLI SIG Assessment Conference*.
- Heilporn, G., Lakhal, S., & Bélisle, M. (2020). An examination of teachers' strategies to foster student engagement in blended learning in higher education. *International Journal of Educational Technology in Higher Education*, 17(1), 1–25.
- Heilporn, G., Lakhal, S., Bélisle, M., & St-Onge, C. (2020). Student engagement: A multidimensional measurement scale applied to blended course modalities at the university level. *Mesure et évaluation en éducation*, 43(special), 1–31.
- Heilporn, G., Raynault, A., & Frenette, É. (2024). Student engagement in a higher education course: A multidimensional scale for different course modalities. *Social Sciences & Humanities Open*, 9, 100794.
- Hilton, G. L. (2003). Using scenarios as a learning and teaching strategy. *European Journal of Teacher Education*, 26(1), 143–153.
- Iqbal, R., & Every, P. (2005, October). Scenario based method for teaching, learning and assessment. In *Proceedings of the 6th conference on Information technology education* (pp. 261–266).
- Kane, M. (2006). Content-related validity evidence in test development. *Handbook of test development*, 1, 131–153.
- Khanal, N. (2025). Generative AI Literacy and Students' Academic Performance: The Mediating Role of Student Engagement in Higher Education. *Patan Pragya*, 14(2), 54–78.
- Khizar, A., Anwar, M. N., & Malik, M. A. (2019). Role of National Education Policy-2009 and National Professional Standards for Teachers in Developing Teachers' Professionalism. *Bulletin of education and research*, 4(3), 101–118.
- Klassen, R. M., Kim, L. E., Rushby, J. V., & Bardach, L. (2020). Can we improve how we screen applicants for initial teacher education? *Teaching and Teacher Education*, 87, 102949. <https://doi.org/10.1016/j.tate.2019.102949>
- Lawshe, C. H. (1975). A quantitative approach to content validity. *Personnel Psychology*, 28(4), 563–575. <https://doi.org/10.1111/j.1744-6570.1975.tb01393.x>
- Lynn, M. R. (1986). Determination and quantification of content validity. *Nursing Research*, 35(6), 382–385. <https://doi.org/10.1097/00006199-198611000-00017>
- Malviya, S. B. (2024). 21st Century Skills in Education: A Review of Frameworks and Implementation. *AG Volumes*, 45–55.
- Marope, P. T. M. (2016). Quality and development-relevant education and learning: Setting the stage for the Education 2030 Agenda. *Prospects*, 46(1), 1–3.
- Masroor, R. (2025). Cultivating 21st Century Skills: Critical Thinking, Creativity, Collaboration, and Communication.
- McKenney, S., & Reeves, T. C. (2013). Educational design research. In *Handbook of research on educational communications and technology* (pp. 131–140). New York, NY: Springer New York.
- Merseth, K. K. (1996). Cases in teacher education.

- Munawar, S., Sattar, K., & Gull, M. (2020). National professional standards for teachers: Developing teachers' professionalism at secondary level. *Journal of Secondary Education and Research*, 2(2), 53-66.
- Nicol, D. J., & Macfarlane-Dick, D. (2006). Formative assessment and self-regulated learning: A model and seven principles of good feedback practice. *Studies in higher education*, 31(2), 199-218.
- Öztemur, H., Karabağ, A., Öcel, M., & Zengin, O. (2024). Exploring the horizons of education: Insights from UNESCO's 2030 agenda. *International Journal of Eurasian Education and Culture*, 9(25), 167-179.
- Pedro, A., Piedade, J., Matos, J. F., & Pedro, N. (2019). Learning scenarios in teacher education. *The International Journal of Information and Learning Technology*, 36(3), 266-283.
- Phelps, G., Kinsey, D., Florek, T., & Jones, N. (2023). Using Performance tasks to provide feedback and assess progress in teacher preparation. *ETS Research Report Series*, 2023(1), 1-44.
- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29(5), 489-497. <https://doi.org/10.1002/nur.20147>
- Reeves, T., & McKenney, S. (2015). Design-based research. In *The SAGE encyclopedia of educational technology* (pp. 189-191). SAGE Publications Inc.
- Rodrigues, M. A., et al. (2024). Critical Thinking Evaluation Scale Based on Formative Assessments. Licensed under CC BY 4.0.
- Rodríguez-Rojas, M. P., Ramírez-Segura, A. M., Valenzuela-Mora, P., Dampuré, J., & Riveros Munévar, F. (2024). Critical thinking evaluation scale: Design and validation in a Colombian population. *Sage Open*, 14(4), 21582440241297418.
- Saeedian, S., & Ghaderi, A. (2023). Scenario-based classroom context mode. *Asian-Pacific Journal of Second and Foreign Language Education*, 8(1), 36.
- Scott, E. E., Wenderoth, M. P., & Doherty, J. H. (2020). Design-based research: A methodology to extend and enrich biology education research. *CBE—Life Sciences Education*, 19(2), e511.
- Shuaib, M., Adnan, M., Ullah, I., & Ali, N. (2024). Exploring the Challenges and Effectiveness of Teacher Education Programs in Pakistan for Promoting 21st Century Skills Acquisition. *Journal of Social Sciences Research & Policy*, 2(3), 213-234.
- Shulman, J. H. (1992). Case methods in teacher education.
- Siddiqui, K. A. (2021). Teacher training in Pakistan: Overview of challenges and their suggested solutions. *IJORE: International Journal of Recent Educational Research*.
- Trilling, B., & Fadel, C. (2009). *21st century skills*.
- Zhang, M., van Rijn, P. W., Deane, P., & Bennett, R. E. (2019). Scenario-based assessments in writing. *Educational Assessment*, 24(2), 73-90.
- Zimmerman, B. J. (2002). Becoming a self-regulated learner: An overview. *Theory into Practice*, 41(2), 64-70. https://doi.org/10.1207/s15430421tip4102_2
- Zimmerman, B. J., Moylan, A., Hudesman, J., White, N., & Flugman, B. (2011). Enhancing self-reflection and mathematics achievement of at-risk urban technical college students. *Psychological Test and Assessment Modeling*, 53(1), 141.