Empowering Critical Thinking and Research Skills Through Mini Research: An Outcome-Based Education Approach in the Master of Elementary Education Program at Universitas Terbuka

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Abstract

The ability to conduct research is a key competence that must be mastered by students, particularly in the Integration of Theory and Practice in Learning course (MPDR5102) in the Master's Program of Elementary Education at Universitas Terbuka, an open and distance learning institution. Research-based learning through mini-research assignments serves as a strategic vehicle for developing critical thinking, scientific literacy, and the integration of theory with professional practice. This study analyzes the implementation of mini research assignments within the Outcome-Based Education (OBE) framework, which emphasizes student-centered learning and measurable competency outcomes. A descriptive quantitative method was employed with 230 student respondents selected through total sampling. The instrument consisted of a 42-item Likert-scale questionnaire (validity: r = 0.641–0.925; reliability: α = 0.987), supplemented by in-depth interviews with 23 purposively selected students. Results showed that overall implementation scores were in the high to very high category (mean = 3.27–3.76), with strong performance in project-based learning comprehension, research application, and guideline understanding. The highest-scoring indicator was task usefulness (mean = 3.73), reflecting students' direct perception of mini-research benefits for professional development. Topic selection and report writing recorded relatively lower scores, indicating areas requiring further support. The main challenges identified were time management, limited access to quality references, academic writing difficulties, and restricted mentoring. The study recommends strengthening guidance systems, improving digital library access, and providing academic writing and publication mentoring to support the sustainable success of OBE implementation in distance education.

Keywords: mini research, outcome-based education, critical thinking, integration of theory and practice, master's program in elementary education

Introduction

Higher education in the 21st century faces increasingly complex challenges. Universities are now required not only to produce graduates who master theory, but also to think critically, analytically, and creatively in accordance with the needs of a rapidly changing world of work (Gómez et al., 2025; Zhao et al., 2025). Globally, the fourth Sustainable Development Goal (SDG 4) emphasizes quality education focused on learning outcomes and process effectiveness (Mahrishi et al., 2025). In Indonesia, Law Number 12 of 2012 concerning Higher Education stipulates that research activities must be integral to the learning process, enabling students to become creators of new knowledge. Universitas Terbuka, as an open and distance learning institution, plays an important role in expanding educational access to the wider community (Najjar et al., 2025).

In the Master of Primary Education Program, research competence is a primary requirement for graduates who are expected to become reflective and innovative educators. The Ministry of Education, Culture, Research, and Technology (2020) in the National Higher Education Standards emphasizes that master's program students must be able to develop and apply knowledge through research to solve real-world problems in their field. In other words, research is not merely an academic task but also a means of developing educators' professionalism. Previous studies confirm that mini-research-based assignments improve students' critical thinking and academic writing skills (Susilo, 2022; Widiantie et al., 2025), while also helping students understand the practical implementation of scientific research methods.

Distance learning presents unique challenges in realizing these goals. In the context of Universitas Terbuka, common obstacles include high assignment loads, limited direct interaction with lecturers, and variations in students' digital literacy skills. These conditions call for learning design innovations that encourage active inquiry while fostering independent learning. The Outcome-Based Education (OBE) approach provides a relevant framework by orienting the entire learning process toward measurable learning outcomes, shifting from lecturer-centered to student-centered learning (Keo et al., 2025; Li et al., 2025). In this approach, students become the primary actors responsible for their own learning, while lecturers act as facilitators who guide students toward the achievement of specific competencies (Sun & Lee, 2020).

Research evidence strongly supports the effectiveness of active learning methodologies within the OBE framework. Innovative approaches such as problem-based learning, project-based learning (PBL), and inquiry-based learning (IBL) have been shown to significantly improve academic performance and develop higher-order thinking skills, including creative thinking, critical thinking, and problem-solving (Luchang & Nasri, 2023; Sam, 2024). A systematic review of PBL indicates positive impacts on collaboration, self-regulated learning, and interdisciplinary skills at various educational levels (Almazroui, 2023; Birdman et al., 2022). The mini-research implementation strategy integrates research steps into the learning process, enabling students to address authentic problems from formulation through communication of research findings (Karogal et al., 2025).

Despite growing evidence on OBE and research-based learning, several knowledge gaps remain. Research on critical thinking development in postgraduate distance learning is still limited, with a recognized need for studies that assess the adaptability of OBE frameworks outside technical fields (Hu, 2023; Reilly & Reeves, 2023). Previous studies tend to examine

general student perceptions without analyzing specific implementation dimensions such as guideline comprehension, the topic selection process, and research report writing. Moreover, comprehensive evaluations of mini-research as a learning strategy in elementary education master's programs, particularly in distance education institutions, are still rare.

This study was designed to address these gaps by analyzing the implementation of mini research assignments in the MPDR5102 Theory and Practice of Learning Integration course at Universitas Terbuka's Master of Primary Education Program. The main objectives are to evaluate the level of mini-research implementation based on OBE principles, identify supporting and inhibiting factors in that implementation, and formulate strategic recommendations to improve the effectiveness of student research activities. The findings are expected to contribute both theoretically to the development of research-based learning models in distance education and practically to the strengthening of meaningful, sustainable learning practices at Universitas Terbuka.

Method

This study employs a quantitative descriptive approach to describe and analyze the implementation of mini-research assignments in the MPDR5102 Integration of Theory and Practice in Learning course at Universitas Terbuka's Master of Primary Education Program. This approach was selected because it is well-suited for obtaining a comprehensive picture of mini-research implementation levels based on students' perceptions, which can be measured systematically and objectively (Creswell & Creswell, 2017; Huyler & McGill, 2019). Qualitative data from in-depth interviews and open-ended questionnaire items complemented the quantitative findings by identifying obstacles and development suggestions in greater depth.

Participants

The research was conducted during the odd and even semesters of the 2024/2025 academic year. The population comprised all first-semester students enrolled in the MPDR5102 course during that period. Using total sampling, whereby all enrolled students were included as respondents, a total of 230 students completed the questionnaire. The total sampling technique was chosen to ensure that all relevant student experiences were captured, given that the entire population had direct experience with the mini-research assignment being evaluated. Additionally, 23 students were purposively selected for in-depth interviews based on the variety of experiences and obstacles they reported, to enrich and contextualize the quantitative data.

Instruments

The research instrument was a structured questionnaire of 42 statement items using a four-point Likert scale (1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree). The even-point scale was deliberately chosen to avoid central tendency bias and encourage respondents to express clear positions on each statement (Chyung et al., 2017; Hartley, 2014). The questionnaire measured four main aspects of mini-research implementation: (1) understanding of material (6 items covering module comprehension and relevance to daily professional tasks); (2) understanding of project-based tasks (14 items covering understanding of project-based learning, research application, and general and specific provisions); (3) implementation of project-based tasks or mini research (12 items covering topic selection, title determination,

research steps, and theoretical review); and (4) report writing (10 items covering writing accuracy and task usefulness).

The instrument was validated through Pearson's Product-Moment correlation analysis, with items declared valid if the correlation coefficient (r) was ≥ 0.30 (Pallant, 2020). Validity testing was conducted using initial respondent data prior to the main data collection. All 42 items met the validity criterion, with r values ranging from 0.641 to 0.925. Instrument reliability was tested using Cronbach's Alpha, yielding a coefficient of 0.987, indicating very high internal consistency ($\alpha > 0.90$) (George & Mallery, 2024; Tavakol & Dennick, 2011). These psychometric properties confirm that the instrument is both valid and highly reliable for measuring mini-research implementation. Semi-structured interview guidelines were subsequently developed based on preliminary patterns identified in the questionnaire data.

Data Analysis

Quantitative data were analyzed using descriptive statistics, mean, standard deviation, and frequency distribution with SPSS version 25 (Field, 2024; Pallant, 2020). Implementation levels were interpreted using the category criteria in Table 1, adapted from a class range formula with equal intervals for four categories.

Table 1
Likert Scale Score Range

No.	Score Range	Category
1	1.00–1.75	Low / Poor
2	1.76–2.50	Moderate / Poor
3	2.51–3.25	High / Good
4	3.26–4.00	Very High / Very Good

Note. Adapted from the class range formula with equal intervals for four categories.

Qualitative data from open-ended questionnaire responses and interview transcripts were analyzed using thematic content analysis following Braun and Clarke's (2022) six-stage process: familiarization with the data, initial coding, theme generation, theme review, theme definition and naming, and report compilation. This qualitative component served to enrich, clarify, and contextualize the quantitative findings, particularly regarding the specific obstacles students encountered and practical suggestions for improvement. Data collection procedures included submitting a research permit application to the program head, uploading the questionnaire to the course Learning Management System (LMS) via Microsoft Forms, obtaining informed consent from all participants, conducting questionnaire data collection within a specified period, and following up with in-depth interviews lasting 30 to 45 minutes with the 23 selected students. Ethical principles were upheld throughout: participation was voluntary, data were kept confidential, respondent identities were anonymized, and participation had no bearing on students' academic assessments.

Results and Discussion

Results

The implementation of mini-research in the MPDR5102 course achieved high to very high scores across all assessed aspects, with an overall average score between 3.27 and 3.76 on a four-point scale. This result confirms that students have a solid understanding of theory, the ability to apply simple research methods, and the skills to compile research reports in accordance with OBE principles. Table 2 summarizes the average scores for the four main aspects of mini-research implementation.

Table 2
Aspects and Average Scores of Mini Research Implementation

No.	Aspect Assessed	Mean	Interpretation
1	Understanding of Material	3.67	Very High
2	Understanding of Project-Based Tasks	3.68	Very High
3	Implementation of Project-Based Tasks/Mini Research	3.68	Very High
4	Report Writing	3.67	Very High

Note. Primary data from student questionnaires, 2025.

All four aspects were rated in the very high category, reflecting that students adequately understood the concepts, objectives, and research steps integrated into this course. More granular analysis of twelve indicators revealed nuanced findings. The indicator with the highest average score was Task Usefulness (mean = 3.73), covering students' perceptions of mini-research contributions to improving learning quality, broadening knowledge of learning practices, supporting research skills, and assisting in thesis topic determination. High scores on this indicator confirm that students directly perceive the practical benefits of mini-research in developing their professional competencies.

The Simple Research Steps Determination indicator ranked second (mean = 3.72), indicating that students could plan, implement, and follow research stages according to the provided guidelines. The Theory Study indicator (mean = 3.70) showed that students were able to examine theories relevant to their research topics and utilize books and scientific articles as reference sources. The Project-Based Learning Understanding indicator (mean = 3.69) confirmed that the concept of project-based learning as a pedagogical approach was well understood and considered aligned with national higher education standards. The Understanding of Research (mean = 3.68), Title Determination (mean = 3.68), Understanding of General Provisions (mean = 3.68), Usefulness of Material in Daily Tasks (mean = 3.67), Understanding of Modules (mean = 3.66), and Understanding of Specific Requirements (mean = 3.66) indicators all demonstrated solid implementation across multiple learning dimensions.

Two indicators recorded relatively lower scores compared to the others. The Topic Selection indicator obtained a mean of 3.62, indicating challenges in the process of identifying research topics appropriate to students' specific learning contexts. The Understanding and Accuracy of Report Writing indicator recorded the lowest average score at 3.60, suggesting that the process of compiling research reports remains an area requiring additional attention and targeted support. These two lower-scoring indicators align with the qualitative findings regarding

student obstacles, which are elaborated further in the discussion. The psychometric quality of the instrument is presented in Table 3.

Table 3
Validity and Reliability Test Results

Analysis	Value Range	Criteria	Description
Pearson Correlation (42 items)	0.641–0.925	≥ 0.30	All items valid
Cronbach's Alpha	0.987	≥ 0.90	Very high reliability

Note. SPSS test results, 2025.

Qualitative analysis of open-ended questionnaire responses and in-depth interviews with 23 students identified ten main categories of obstacles students encountered in conducting mini-research. These are presented in Table 4.

Table 4
Student Challenges in Mini Research Implementation

No.	Challenge Category	Brief Description	Frequency (n)
1	Time Management	Difficulty balancing work, family, and studies	130
2	Reference Access	Difficulty obtaining scientific journals and relevant literature	75
3	Paraphrasing and Plagiarism	Difficulty reducing similarity levels on Turnitin	60
4	Scientific Writing	Not yet accustomed to academic language and structure	55
5	Research Methodology	Lack of understanding of appropriate data analysis techniques	45
6	Collaboration and Discussion	Limited academic interaction with fellow students	40
7	Technical Support	Internet access and statistical application constraints	32
8	Learning Motivation	Some students lose motivation during the process	28
9	Academic Supervision	Limited direct feedback from supervisors	23
10	Psychological	Lack of confidence in conducting research	15

Discussion

The findings confirm that the OBE approach, realized through mini-research assignments, effectively facilitates the achievement of expected learning outcomes in a distance education

setting. The overall high average scores across the four main aspects indicate that the learning design and implementation guidelines have been coherently constructed to support holistic competency development. These results are consistent with Katawazai (2021), who confirms that OBE with an emphasis on student-centered learning and demonstration of real competencies increases learning effectiveness in higher education, and with Rachael (2024), who underscores that successful OBE implementation requires alignment between learning outcomes, learning strategies, and authentic assessment.

The consistent achievement across all four aspects, understanding of material (3.67), understanding of project-based tasks (3.68), project-based task implementation (3.68), and report writing (3.67), demonstrates that mini-research does not merely develop one dimension of competence but fosters conceptual understanding, procedural skills, and comprehensive application abilities simultaneously. High scores on indicators of project-based learning understanding (mean = 3.69) and research steps implementation (mean = 3.72) indicate that students not only understand the concept of project-based learning theoretically but are also able to apply it in practice by identifying real learning problems in their classrooms, designing appropriate research methodologies, collecting and analyzing data, and drawing actionable conclusions (Hursen, 2021; Zakwandi & Istiyono, 2023).

The highest-scoring indicator, Task Usefulness (mean = 3.73), is particularly noteworthy. Items in this indicator related to mini-research improving learning quality, broadening knowledge of learning practices, serving as evidence of professional teaching, and supporting research skill development all received very high scores. This confirms the direct and significant perceived benefits of mini-research in developing professional competencies. This finding is consistent with Susilo (2022), who found that mini-research projects not only improve writing and problem analysis skills but also accelerate thesis writing by accustoming students to the scientific research process. In the context of the Master of Elementary Education Program, where graduates are expected to become agents of change and research-capable professional educators, the ability to conduct classroom action research is a fundamental competency that distinguishes professional teachers (Johannesson & Olin, 2024).

High scores on items related to the application of theory in practice, specifically that project-based learning combines theory and practice in real life, that mini-research is conducted in actual classroom contexts, and that theoretical study aligns with research topics, confirm that mini-research successfully bridges the gap between theoretical knowledge and teaching practice. This is particularly important in a master's program where students are practicing educators who require competence in integrating theory with their professional context (Resch & Schrittesser, 2023). In the distance learning context, this finding has special significance because it demonstrates that, with the right learning design, distance education can facilitate meaningful and contextualized learning even without frequent face-to-face interaction (Yunus & Bachtiar, 2025).

The most prevalent obstacle was time management, experienced by 56.5% of respondents. This finding reflects the double burden carried by master's program students who are simultaneously full-time education practitioners. These students must balance professional responsibilities as educators teaching, administrative duties, and extracurricular activities with academic responsibilities including lectures, assignments, and literature reading, as well as personal and family obligations. In this situation, mini-research assignments requiring a full sequence of activities from planning through report writing demand a substantial allocation of time. Glazkova et al. (2025) identify increasing demands on students, limited remote

communication, and varying home learning conditions as inherent challenges in distance education requiring specific strategies to overcome. Students' suggestions to extend deadlines, provide clear stage-by-stage timelines from the beginning of the semester, and avoid overlap with other courses reflect the need for more mature learning planning that accounts for students' holistic workloads and provides adequate scaffolding (Hrastinski et al., 2025).

The second most significant obstacle was limited access to quality references, experienced by 32.6% of respondents. Students faced difficulties in accessing scientific journals, limited library collections, obstacles in accessing the Universitas Terbuka digital library, and unfamiliarity with reference management applications such as Mendeley. In an era where information access should be facilitated by technology, this finding highlights the persistent digital divide in the context of distance learning in Indonesia. Brew and Saunders (2020) emphasize that research-based learning requires students to review prior theories and research as a foundation for their own inquiry; limited reference access can lead to superficial literature reviews, weak theoretical frameworks, and shallow interpretations of findings, ultimately affecting the quality of both mini-research outputs and thesis work.

Academic writing challenges were reported by 23.9% of respondents, while plagiarism and paraphrasing difficulties affected 26.1%. These findings reflect the broader challenge of transitioning from knowledge consumption to original knowledge production in academic writing. Teng and Yue (2023) identified that transforming critical thinking into coherent academic writing is a significant challenge in online learning environments, particularly for students who have not engaged in formal academic writing for extended periods. Item X35, which asked whether report writing was free of obstacles, recorded the lowest average score (mean = 3.27) with the highest standard deviation (SD = 0.770), indicating both the most significant challenge and the widest variation in student experience. This variation suggests that while some students navigate academic writing with relative ease, others face substantial difficulties requiring targeted intervention.

Research methodology challenges were experienced by 19.6% of respondents, who reported difficulties in selecting appropriate theories, determining suitable research methods, and analyzing data comprehensively. These findings are consistent with studies on postgraduate distance learning that identify methodological competency development as requiring more than written guidelines; it necessitates dialogic interaction between students and supervisors (Kovalova, 2025). Although only 13% of respondents explicitly mentioned limited guidance as an obstacle, this finding carries significant implications. Students need intensive mentoring covering research methodology, scientific writing techniques, instrument validity, data analysis, and feedback on research drafts. The concept of scaffolding in Vygotsky's social constructivism, where optimal learning occurs in the Zone of Proximal Development through mediation from more experienced individuals, provides the theoretical basis for understanding why such guidance is essential. Manousou (2025) confirms that in developing critical thinking through online learning, the instructor's role as a facilitator and provider of constructive feedback is crucial for helping students develop analytical, evaluative, and synthetic abilities.

Despite these challenges, approximately 50 respondents (21.7%) reported no significant obstacles, indicating that they were well-supported by clear guidelines, provided templates, or prior research experience. This underscores the differential impact of scaffolding on student experience: adequate support mechanisms can substantially reduce anxiety and build confidence, as evidenced by findings on self-efficacy in OBE frameworks (Al Hadi et al., 2025). Students also provided constructive suggestions that extend beyond individual support

to systemic change. The most frequently suggested improvement was more intensive technical and substantive guidance from lecturers or tutors, covering research methodology, scientific writing, instrument validity, and data analysis. Students also emphasized the need for completed examples of mini-research reports, more detailed technical instructions, writing templates aligned with scientific journal standards, and tutorials on supporting applications, including Mendeley, SPSS, and plagiarism checking tools. Follow-up toward scientific publication was another notable aspiration, reflecting students' desire to contribute to knowledge dissemination through SINTA-indexed journals, a direction consistent with the concept of Scholarship of Teaching and Learning (Johannesson, 2022; Yeo et al., 2023).

This study also extends the literature on project-based learning at the postgraduate level in distance education contexts. While Owens and Hite (2022) demonstrate that project-based learning effectively develops various postgraduate competencies, most existing studies were conducted in face-to-face programs in developed countries. This study demonstrates that in the context of distance education in Indonesia, with its unique student profiles as full-time working educators, limited infrastructure access, and geographically dispersed student populations, project-based learning through mini-research can still achieve consistently positive results when supported by coherent learning design and responsive institutional support (Gu et al., 2025; Naseer et al., 2025).

From an institutional policy perspective, the findings suggest several strategic priorities. First, learning infrastructure must be strengthened, including institutional subscriptions to international journal databases and institutional accounts for applications such as Turnitin and Mendeley (Yu & Cai, 2025). Second, lecturer and tutor capacity in online research mentoring needs systematic development, including training on effective feedback strategies in virtual environments. Third, course workload policies should be reviewed to prevent simultaneous heavy assignment deadlines across different courses. Fourth, developing communities of practice among students and alumni can provide peer support, shared problem-solving, and collaborative publication opportunities, an effective strategy for sustaining a research-oriented learning culture. Ali (2024) adds that in OBE implementation, continuous formative feedback is a key element in ensuring that students achieve expected learning outcomes, reinforcing the need for structured, ongoing mentoring rather than one-time orientation activities.

The study has several limitations worth acknowledging. First, the descriptive design without a control group precludes causal conclusions about the effectiveness of mini-research relative to other learning approaches. Second, self-reported data through questionnaires and interviews may contain social desirability bias. Third, the study does not examine differences in experience based on student characteristics such as teaching experience level, prior educational background, geographical location, or gender. Fourth, the study's focus on a single course in one program limits direct generalizability to other contexts. Fifth, the long-term impact of mini-research experience on students' professional practices and thesis completion was not examined. These limitations suggest directions for future research, including longitudinal studies, comparative designs, and investigations of specific student subgroups.

Conclusion

This study confirms that the implementation of mini-research in the MPDR5102 Integration of Learning Theory and Practice course at Universitas Terbuka's Master of Primary Education Program has been successful and positively impactful. Implementation levels across all four assessed aspects, understanding of material, understanding of project-based tasks, research

implementation, and report writing, were classified as high to very high, demonstrating that the OBE-based research approach effectively bridges the gap between theory and practice in distance education. Through active participation in research, students develop critical thinking, reflective abilities, and scientific literacy, which are core OBE learning outcomes.

Despite this achievement, significant barriers remain. Time management challenges, compounded by students' dual roles as educators and learners, affect more than half of all respondents. Limited access to quality references, academic writing difficulties, and restricted mentoring access further challenge successful implementation. These barriers are not merely individual limitations but reflect systemic conditions requiring institutional intervention.

To strengthen sustainable OBE implementation through mini-research, this study recommends: (1) developing clear, stage-by-stage research timelines provided at the start of the semester to support time management and reduce workload overlap with other courses; (2) establishing systematic mentoring models including regular virtual consultations, peer-to-peer study groups, structured milestone feedback, and assessment rubrics for each research stage; (3) improving digital library infrastructure through international journal database subscriptions, enhanced LMS functionality, and information literacy training; (4) conducting academic writing workshops covering research report structure, effective paraphrasing, citation and referencing conventions, and plagiarism prevention; and (5) optimizing the use of educational technology through digital repositories of exemplary mini-research, tutorial videos, and student progress dashboards. Implementing these recommendations will strengthen students' competencies as professional, research-capable educators and contribute to the broader development of research-based learning models in distance education at the postgraduate level.

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Declaration of Generative AI and AI-Assisted Technologies in the Writing Process

The author declares that an AI-assisted writing tool was used to improve the language clarity and readability of the manuscript. Its use was limited to rephrasing and refining sentences for grammatical accuracy and clarity of expression. The author further declares that no AI or AI-assisted technologies were used to generate, fabricate, or substitute the intellectual content of this manuscript. The ideas, research design, data collection, analysis, interpretation, and discussion are the original work of the author and are derived from the systematic conduct of the research.

References

Al Hadi, A. F. M. Q., Anggraini, F. N. A., Asmara, L., Murni, L. I. M., & Salim, M. F. (2025). Optimization Strategies for Student Scientific Publications in Islamic Higher Education Institutions to Enhance Academic Competence Based on Outcome-Based Education (OBE). *Suhuf: International Journal of Islamic Studies, 37*(1). https://doi.org/10.23917/suhuf.v37i1.10020

Ali, Q. I. (2024). Towards more effective summative assessment in OBE: a new framework integrating direct measurements and technology. *Discover Education, 3*(1), 107. https://doi.org/10.1007/s44217-024-00208-5

Almazroui, K. M. (2023). Project-based learning for 21st-century skills: An overview and case study of moral education in the UAE. *The Social Studies, 114*(3), 125–136. https://doi.org/10.1080/00377996.2022.2134281

Birdman, J., Wiek, A., & Lang, D. J. (2022). Developing key competencies in sustainability through project-based learning in graduate sustainability programs. *International Journal of Sustainability in Higher Education, 23*(5), 1139–1157. https://doi.org/10.1108/IJSHE-12-2020-0506

Braun, V., & Clarke, V. (2022). *Thematic analysis: A practical guide*. SAGE Publications.

Brew, A., & Saunders, C. (2020). Making sense of research-based learning in teacher education. *Teaching and Teacher Education, 87*, 102935. https://doi.org/10.1016/j.tate.2019.102935

Chyung, S. Y., Roberts, K., Swanson, I., & Hankinson, A. (2017). Evidence-based survey design: The use of a midpoint on the Likert scale. *Performance Improvement, 56*(10), 15–23. https://doi.org/10.1002/pfi.21727

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. SAGE Publications.

Creswell, J. W., & Poth, C. N. (2016). *Qualitative inquiry and research design: Choosing among five approaches*. SAGE Publications.

Field, A. (2024). *Discovering statistics using IBM SPSS statistics*. SAGE Publications.

George, D., & Mallery, P. (2024). *IBM SPSS statistics 29 step by step: A simple guide and reference*. Routledge. https://doi.org/10.4324/9781032622156

Glazkova, I., Falko, N., Khomenko, O., Khatuntseva, S., Rula, N., Shulzhenko, A., & Tatarin, V. (2025). Barriers in online education for displaced universities: Insights from faculty and students. *Problems and Perspectives in Management, 23*(2), 136–150. https://doi.org/10.21511/ppm.23(2-si).2025.10

Gómez, D. L., Álvarez Maestre, A. J., Parada Trujillo, A. E., Pérez Fuentes, C. A., Bedoya Ortiz, D. H., & Sanabria Alarcón, R. K. (2025). Determining factors for the development of critical thinking in higher education. *Journal of Intelligence, 13*(6), 59. https://doi.org/10.3390/jintelligence13060059

Gu, P., Cheng, Z., Miaoting, C., Poggio, J., & Dong, Y. (2025). Integrating project-based learning with self-regulated learning to enhance programming learning motivation. *Journal of Computer Assisted Learning, 41*(2), e70011. https://doi.org/10.1111/jcal.70011

Hartley, J. (2014). Some thoughts on Likert-type scales. *International Journal of Clinical and Health Psychology, 14*(1), 83–86. https://doi.org/10.1016/S1697-2600(14)70040-7

Hrastinski, S., Paul, E., & Åkerfeldt, A. (2025). Temporal-spatial and pedagogical flexibility in distance education. *Distance Education, 46*(3), 435–451. https://doi.org/10.1080/01587919.2024.2380370

Hu, S. (2023). An investigative study of factors affecting talent development systems in higher education management programs under the OBE philosophy. *International Journal of New Developments in Education, 5*(24), 174–179. https://doi.org/10.25236/IJNDE.2023.052428

Hursen, C. (2021). The effect of the problem-based learning method supported by Web 2.0 tools on academic achievement and critical thinking skills in teacher education. *Technology, Knowledge and Learning, 26*(3), 515–533. https://doi.org/10.1007/s10758-020-09458-2

Huyler, D., & McGill, C. M. (2019). *Book Review: Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. https://doi.org/10.1002/nha3.20258

Johannesson, P. (2022). Development of professional learning communities through action research. *Educational Action Research, 30*(3), 411–426. https://doi.org/10.1080/09650792.2020.1854100

Johannesson, P., & Olin, A. (2024). Teachers' action research as a case of social learning. *Scandinavian Journal of Educational Research, 68*(4), 735–749. https://doi.org/10.1080/00313831.2023.2175253

Karogal, S., Hegade, P., & Shettar, A. (2025). Creating mini-research spaces in problem based learning curriculum using abstraction. *Journal of Engineering Education Transformations*, *38*, 276–284. https://doi.org/10.16920/jeet/2025/v38is2/25033

Katawazai, R. (2021). Implementing outcome-based education and student-centered learning in Afghan public universities: the current practices and challenges. *Heliyon, 7*(5).

Kementerian Pendidikan, Kebudayaan, Riset dan Teknologi. (2020). *Regulation of the Minister of Education and Culture Number 3 of 2020 concerning National Standards for Higher Education.*

Keo, V., Hak, C., Lan, B., Khong, R., Neang, S., & Hoeurn, S. (2025). Implementing Outcome-Based Education in Higher Education: Challenges and Benefits. *International Journal of Educational and Psychological Sciences, 3*(5), 511–530. https://doi.org/10.59890/ijeps.v3i5.138

Kovalova, Y. (2025). Project-based learning in online education: Experience of real cases as a means of developing professional skills. *European Journal of Interdisciplinary Issues, 2*(1), 9–15. https://doi.org/10.5281/zenodo.15090375

Li, J., Feng, L., Song, Q., Zhang, Y., & Guo, X. (2025). The construction of a talent cultivation system for the robot engineering major based on the OBE concept. *IJLAI Transactions on Science and Engineering, 3*(3), 67–73.

Luchang, A. L., & Nasri, N. M. (2023). Project-based learning (PBL) in enhancing students' higher-order thinking skills (HOTS): Systematic literature review. *International Journal of Academic Research in Progressive Education and Development, 12*(4), 1651–1679.

Mahrishi, M., Ramakrishna, S., Hosseini, S., & Abbas, A. (2025). A systematic literature review of the global trends of outcome-based education (OBE) in higher education with an SDG perspective related to engineering education. *Discover Sustainability, 6*(1), 1–21. https://doi.org/10.1007/s43621-025-01496-z

Manousou, E. (2025). Critical thinking in distance education: The challenges in a decade (2016–2025) and the role of artificial intelligence. *Education Sciences, 15*(6), 757. https://doi.org/10.3390/educsci15060757

Najjar, N., Rouphael, M., Bitar, T., & Hleihel, W. (2025). The rise and drop of online learning: adaptability and future prospects. *Frontiers in Education, 10*, 1522905. https://doi.org/10.3389/feduc.2025.1522905

Naseer, F., Tariq, R., Alshahrani, H. M., Alruwais, N., & Al-Wesabi, F. N. (2025). Project based learning framework integrating industry collaboration to enhance student future readiness in higher education. *Scientific Reports, 15*(1), 24985. https://doi.org/10.1038/s41598-025-10385-4

Owens, A. D., & Hite, R. L. (2022). Enhancing student communication competencies in STEM using virtual global collaboration project based learning. *Research in Science & Technological Education, 40*(1), 76–102. https://doi.org/10.1080/02635143.2020.1778663

Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge. https://doi.org/10.4324/9781003117452

Rachael, O. (2024). *Aligning learning outcomes with teaching practices: Evaluating the effectiveness of outcome-based education (OBE) frameworks*. https://www.researchgate.net/publication/396291980

Reilly, C., & Reeves, T. C. (2023). Tracking transdisciplinary skills in the design of online courses: A design-based research study. *Computers & Education, 204*, 104867. https://doi.org/10.1016/j.compedu.2023.104867

Resch, K., & Schrittesser, I. (2023). Using the service-learning approach to bridge the gap between theory and practice in teacher education. *International Journal of Inclusive Education, 27*(10), 1118–1132. https://doi.org/10.1080/13603116.2021.1882053

Sam, R. (2024). Systematic review of inquiry-based learning: Assessing impact and best practices in education. *F1000Research, 13*, 1045. https://doi.org/10.12688/f1000research.155367.1

Sun, P. H., & Lee, S. Y. (2020). The importance and challenges of outcome-based education—a case study in a private higher education institution. *Malaysian Journal of Learning and Instruction, 17*(2), 253–278.

Susilo, M. J. (2022). The importance of mini research projects for accelerating thesis writing. *Anatolian Journal of Education, 7*(2), 193–200. https://doi.org/10.29333/aje.2022.7215a

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education, 2*, 53–55. https://doi.org/10.5116/ijme.4dfb.8dfd

Teng, M. F., & Yue, M. (2023). Metacognitive writing strategies, critical thinking skills, and academic writing performance: A structural equation modeling approach. *Metacognition and Learning, 18*(1), 237–260. https://doi.org/10.1007/s11409-022-09328-5

Widiantie, R., Junaedi, E., & Amanah, S. P. (2025). Development of 21st century skills integrated mini research e-assessment for prospective teacher. *Jurnal Penelitian Pendidikan IPA, 11*(4), 104–112. https://doi.org/10.29303/jppipa.v11i4.10512

Yeo, M., Miller-Young, J., & Manarin, K. (2023). *SoTL research methodologies: A guide to conceptualizing and conducting the Scholarship of Teaching and Learning*. Routledge. https://doi.org/10.4324/9781003447054

Yu, L., & Cai, L. (2025). Contemporary American literature in distance learning: Creating reading motivation and student engagement. *Reading Research Quarterly, 60*(2), e609. https://doi.org/10.1002/rrq.609

Yunus, M., & Bachtiar, B. (2025). Exploring the complexities of thesis writing in the distance mode: Postgraduate students' perspectives, challenges and strategies. *Asian Association of Open Universities Journal, 20*(1), 68–81. https://doi.org/10.1108/AAOUJ-07-2024-0099

Zakwandi, R., & Istiyono, E. (2023). A framework for assessing computational thinking skills in the physics classroom. *SN Social Sciences, 3*(3), 46. https://doi.org/10.1007/s43545-023-00633-7

Zhang, M., He, Q., Du, J., Liu, F., & Huang, B. (2022). Learners' perceived advantages and social-affective dispositions toward online peer feedback in academic writing. Frontiers Zhao, G., Sheng, H., Wang, Y., Cai, X., & Long, T. (2025). Generative artificial intelligence amplifies the role of critical thinking skills and reduces reliance on prior knowledge while promoting in-depth learning. *Education Sciences, 15*(5), 554. https://doi.org/10.3390/educsci15050554