

International Journal of Learning, Teaching and Educational Research
 Vol. 25, No. 7, pp. 110-135, July 2026
<https://doi.org/10.26803/ijlter.25.7.6>
 Received Apr 27, 2026; Revised Jun 15, 2026; Accepted Jun 18, 2026

No Lecturer Left Behind: An In-Service Professional Development Programme for Enhancing the Teaching and Assessment Skills of Instructors at a Public University in China

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Abstract. In higher education, professional development is widely valued, but limited attention has been given to how selective professional learning can be converted into a local programme that supports wider lecturer participation and later classroom readiness. At Yan'an University, a public university in China, earlier high-value professional learning opportunities, including overseas training, reached only a small group of teachers. This study addressed this access gap by developing and refining a local In-Service Teacher Training Programme (ISTTP) for a broader group of lecturers. Guided by Design and Development Research, the study examined how the ISTTP was designed, how its practicality was reflected in teacher feedback, and how that feedback informed refinement. Thirty-six instructors, selected from 18 faculties with two teachers from each faculty, completed a questionnaire after the two-day programme. Six randomly selected participants later joined semi-structured follow-up interviews approximately three months after the training. The questionnaire examined five practicality dimensions: classroom relevance, connection to prior teaching experience, clarity of examples, usefulness of activities, and potential for use in participants' own teaching. Findings showed that the ISTTP was generally perceived as relevant and practical, while Collaborative Learning, Assessment Strategies, and Self-Assessment and Reflection required stronger support for classroom use. Semi-structured follow-up interviews explained these patterns through challenges related to facilitation, time pressure, disciplinary differences, and institutional conditions. The evidence informed refinements including clearer guidance, structured activities,

Citation :

Lu, L., Eng, L. S. (2026). No Lecturer left behind: No Lecturer Left Behind: An In-Service Professional Development Programme for Enhancing the Teaching and Assessment Skills of Instructors at a Public University in China. *International Journal of Learning, Teaching and Educational Research*, 25(7), 110-135. <https://doi.org/10.26803/ijlter.25.7.6>

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adaptation support, and discipline-sensitive examples. The study contributes a DDR-based model for transforming selective professional learning into an evidence-informed, locally usable teacher development programme.

Keywords: in-service teacher training; higher education; programme refinement; student-centred learning; teacher professional development

1. Introduction

Higher education increasingly emphasises student-centred pedagogy, authentic assessment, and teaching approaches that support active engagement and deeper learning (Vlachopoulos & Makri, 2024; Sanches & Paz, 2025; Xiong, 2025). At the same time, emerging technologies such as machine learning are creating new demands for university teaching and lecturer professional development (Taufikin et al., 2024). Professional development has therefore become an important means of improving university teaching. Its value depends on whether new ideas are connected to teachers' actual work and sustained in practice (Acuyo, 2021; Zhang et al., 2024; Smith & Wyness, 2025). This issue is especially relevant in higher education, where teaching is shaped by disciplinary expectations, institutional routines, and uneven access to professional learning opportunities (Ventista & Brown, 2023; Postareff et al., 2024; Silva Didier et al., 2025).

In China, teacher development has been positioned as part of educational modernisation (Ministry of Education of the People's Republic of China, 2019; Li et al., 2023). However, providing training does not automatically lead to meaningful classroom change. At the focal university, previous high-value professional learning opportunities, including overseas training, were available only to a small group of teachers. Although these experiences introduced useful ideas about student-centred teaching and assessment, their benefits did not extend to the wider lecturer population in a systematic way (Wang et al., 2021; Yuan & Gao, 2023). The key problem was therefore how to move from selective professional learning to a localised in-service teacher training programme that could support a broader group of lecturers under real institutional conditions.

Although previous studies have examined higher education professional development, student-centred teaching, and teacher training in China, less attention has been given to how selected professional learning can be transformed into a local in-service programme for a broader group of university lecturers within their own institution. Overseas training can introduce useful ideas, but Chinese teacher educators may still face difficulties when applying these ideas in their home institutions (Wang et al., 2021; Yuan & Gao, 2023). Recent work on teacher training policy in China also emphasises the need for more systematic and locally relevant teacher development (Li et al., 2023). In this study, practicality refers to participants' perceptions of the In-Service Teacher Training Programme (ISTTP) as relevant, clear, useful, and potentially applicable to their own classrooms.

Training transfer is also important because professional development does not automatically lead to classroom use. Baldwin and Ford (1988) explain that transfer is shaped by training design, trainee characteristics, and the work environment. Guskey (2002) further suggests that teacher change is closely connected to later classroom experience. Recent studies also show that university teacher development is more useful when it is linked to teachers' real work and supports continued use after training (Hoadley & Campos, 2022; Peters-Burton et al., 2024; Smith & Wyness, 2025). These perspectives informed the present study's focus on the design of a local ISTTP, the practicality reflected in participant feedback, and the use of that feedback for further refinement.

Against this background, this study investigated the design, development, and refinement of an ISTTP at Yan'an University, a public university in China. Guided by Design and Development Research, the study examined how the ISTTP was developed through an evidence-informed process, how its practicality was reflected in participants' feedback, and how that feedback informed further programme refinement (Hoadley & Campos, 2022; Peters-Burton et al., 2024). DDR was appropriate because it connected needs analysis, programme design, participant feedback, and refinement within one development process. By linking local programme development, practicality, and training transfer, this study contributes to discussions on how university teacher development can be made more usable under real institutional conditions. The study addressed the following three research questions:

1. How was the ISTTP designed and developed within a Design and Development Research framework?
2. How was the practicality of the ISTTP reflected in participants' feedback?
3. How did participants' feedback help refine the programme?

2. Literature Review

Professional development in higher education is widely valued, but its usefulness depends on how well it responds to teachers' needs and supports practice in context (Garone et al., 2022; Bergmark, 2023; Stevens et al., 2024). University faculty members' professional learning priorities vary by teaching role, experience, and work responsibilities (O'Brien et al., 2023; Owusu-Agyeman, 2024). Faculty development is also strengthened when it is collegial, locally grounded, and connected to teachers' daily work (Sinnayah et al., 2024; Smith & Wyness, 2025). This suggests that in-service teacher training should begin with identifying needs, while also supporting classroom use and later refinement.

An ISTTP was important in this study because teachers' professional learning needs had to be addressed within their own institutional setting. At the focal public university, earlier high-value professional learning opportunities, including overseas training, had reached only a small group of selected teachers. Although these experiences introduced useful ideas about student-centred teaching and assessment, they did not provide systematic support for the wider

lecturer population. This created a need for a local programme that could convert selective professional learning into structured support for broader lecturer participation (Wang et al., 2021; Li et al., 2023; Yuan & Gao, 2023).

A persistent concern in the literature is the gap between professional learning and classroom use. Guskey's model of professional development and teacher change suggests that meaningful teacher change is linked to later classroom experience, not only to teachers' immediate response to training (Guskey, 2002). Transfer of Training Theory also explains that training use is shaped by training design, trainee characteristics, and the work environment (Baldwin & Ford, 1988). Recent research similarly shows that teacher training does not automatically lead to classroom application, since **transfer** is shaped by support design, contextual fit, and opportunities for continued adaptation (Donath et al., 2025; Nĩmante et al., 2025; Smith & Wyness, 2025).

This concern is also evident in Chinese higher education. Studies of Chinese teacher educators show that the transfer of new knowledge may also be limited by home-institution conditions, contextual mismatch, uneven professional development engagement (Gu et al., 2023; Gong et al., 2023; Chen, 2025; Zhou & Delogu, 2026). These studies show a continuing tension between positive responses to training and the difficulty of using new ideas under real classroom, disciplinary, and institutional conditions.

Design and Development Research provides the main methodological and conceptual framework for this study because it focuses on the systematic development, evaluation, and refinement of educational products and programmes (Richey & Klein, 2007, 2014). It is also consistent with educational design research, which addresses real educational problems through usable solutions in authentic settings (McKenney & Reeves, 2021, 2025). In this study, DDR allowed the ISTTP to be developed from identified needs, examined through participants' feedback, and refined in response to evidence from classroom use. Within this framework, Guskey's model, Transfer of Training Theory, and Communities of Practice helped explain the movement from training experience to classroom use and continued professional support.

Practicality was treated as the central evaluation focus. In educational design research, practicality concerns whether an intervention is useful and usable in the setting for which it is designed (Nieveen & Folmer, 2013; McKenney & Reeves, 2025). In this study, practicality was examined through five dimensions: classroom relevance, connection to prior teaching experience, clarity of examples, usefulness of activities, and potential for use in participants' own teaching. These dimensions were informed by Merrill's First Principles of Instruction, which emphasise problem-centred learning, activation of prior knowledge, demonstration, application, and integration as key features of effective instruction (Merrill, 2002, 2012; Vaudrey et al., 2024). Classroom relevance reflected problem-centred learning; connection to prior experience reflected activation; clarity of examples and usefulness of activities reflected demonstration and application; and potential for use reflected integration into participants' own teaching. These

dimensions allowed practicality to be examined as classroom-oriented usability, rather than as general satisfaction only.

This focus responds to a wider concern that immediate responses to professional development may not fully show how training ideas are later used in classrooms. Teachers may report positive engagement with training, while later classroom use remains uneven because teaching is shaped by institutional context, professional identity, and local constraints (Orfali et al., 2024; Zwolińska-Gładys et al., 2024; Smith & Wyness, 2025). Recent higher education research further shows that pedagogical ideas become workable when programme designs are adapted to real teaching situations and classroom challenges are recognised over time (Donath et al., 2025; Níamante et al., 2025).

Less attention has been given to how an ISTTP can be designed and developed within a DDR framework, and how participants' immediate and later feedback can be used to examine practicality and refine such a programme in a Chinese public university. This study therefore focuses on the design and development of the ISTTP, the practicality reflected in participants' feedback, and the way this feedback helped refine the programme (Zwolińska-Gładys et al., 2024; Smith & Wyness, 2025; Zhou & Delogu, 2026).

3. Methodology

3.1 Research Design

This study used a Design and Development Research (DDR) framework, which is appropriate for developing and refining educational programmes in real teaching contexts (Richey & Klein, 2014). The study did not aim to test causal relationships or measure programme effectiveness experimentally. Its focus was the design, development, and refinement of an In-Service Teacher Training Programme (ISTTP) for a public university in China. DDR provided the methodological basis for examining how the programme was built from evidence and how participant feedback was used to judge its practicality and guide later improvement.

DDR was used as a practice-oriented and evidence-informed methodological approach, in which knowledge was developed through designing, evaluating, and refining the ISTTP in a real teaching context (McKenney & Reeves, 2021; Tinoca et al., 2022). It connected needs analysis, programme design, pilot refinement, evaluation evidence, and later refinement within one development process. The ISTTP was developed through three phases: needs analysis, design and development, and evaluation and refinement. In this paper, these phases are understood as linked stages in the development of the programme. Quantitative and qualitative evidence were collected at different points in the process.

Before the main study, a pilot study was conducted to examine whether the ISTTP was clear, workable, and suitable for use in practice. The pilot study involved eight in-service university teachers from arts- and science-related disciplines and was facilitated by the same four trainers who later conducted the main study. This sample was suitable because the pilot aimed to identify practical problems before wider use, rather than to conduct large-scale evaluation. Small pilot samples are

commonly used to examine feasibility, clarity, timing, procedures, and activity design before the main study (Johanson & Brooks, 2010; Kunselman, 2024; Sukserm, 2024). In this study, the pilot feedback was used to improve the clarity of training guidance, the relevance of examples, the organisation of activities, and the practical usability of the training materials. Quantitative data captured participants' immediate responses to the practicality of the ISTTP, while qualitative data explored participants' later classroom experiences and the improvements, they considered necessary. These two sources of evidence supported the refinement of the programme within the DDR framework.

3.2 Research Context and Participants

The study was conducted at Yan'an University, a public university in China, which had 18 faculties covering humanities, social sciences, sciences, engineering, medicine, and professional programmes. The ISTTP was delivered to in-service university teachers from these faculties so that participants' feedback could reflect varied teaching backgrounds within the institution. The main participant group consisted of 36 instructors who attended the two-day ISTTP and completed post-training questionnaire. demographic information included gender, age range, years of teaching experience, faculty distribution, and academic title. As shown in Table 1, the participants included 17 male and 19 female instructors and represented different age groups, teaching experience levels, academic ranks, and disciplinary areas.

Table 1: Summary of demographic information of instructors (N = 36)

Characteristic	Category	n
Gender	Male	17
	Female	19
Age range	20–29	3
	30–39	15
	40–49	12
	≥ 50	6
Years of teaching experience	0–5	5
	5–10	11
	11–15	10
	≥ 15	10
Academic title	Teaching Assistant	4
	Lecturer	13
	Associate Professor	13
	Professor	6
Faculty distribution	18 faculties, two teachers from each faculty	36

Note. Values represent the demographic information reported by the 36 instructors in this study.

Six participants also took part in post-training follow-up semi-structured interviews. These interviews offered further insight into classroom use of the programme and the improvements still needed during early application.

3.3 Data Collection

Data collection focused on the evaluation and refinement stages of the ISTTP. Quantitative and qualitative data were collected to examine participants' immediate responses and later classroom experiences. The procedure involved two connected steps. The questionnaire was appropriate because it provided comparable post-training feedback from all 36 instructors across the same sessions and practicality dimensions. Semi-structured interviews then added depth by allowing selected participants to explain how the ISTTP ideas were used in their own classrooms, while still keeping the discussion aligned with the study aims. This combination was suitable because quantitative tools can identify response patterns, whereas semi-structured interviews can provide flexible explanations of participants' experiences and the contextual conditions behind those patterns (Adeoye-Olatunde & Olenik, 2021; Rana & Chimoriya, 2025).

After the two-day ISTTP, all 36 instructors completed the Participant Questionnaire on the Practicality of ISTTP. The participants were drawn from the university's 18 faculties, with two teachers selected from each faculty. This arrangement provided cross-faculty coverage and allowed the study to examine the practicality of the ISTTP across different teaching contexts. The sample size was considered suitable for the descriptive and programme-evaluation purpose of this study, as educational intervention studies may use relatively small samples when the focus is on programme development, feasibility, and contextual evidence rather than statistical generalisation (Besekar et al., 2024).

The questionnaire used a five-point Likert scale and examined five dimensions of session practicality: classroom relevance, connection to prior teaching experience, clarity of examples for classroom use, usefulness of activities for practice, and potential for use in participants' own teaching. These dimensions were aligned with the seven ISTTP sessions and were conceptually informed by Merrill's First Principles of Instruction, as discussed in the literature review. They also directly supported the second research question, which examined how the practicality of the ISTTP was reflected in participants' feedback.

The questionnaire was reviewed by three subject matter experts using a four-point relevance scale. Following content validity procedures, ratings of 3 or 4 were treated as relevant, and the Item-Level Content Validity Index was calculated to examine expert agreement on item relevance (Dalawi et al., 2023). All 35 items obtained an Item-Level Content Validity Index of 1.00, indicating full expert agreement that each item was relevant to the intended construct. Internal consistency reliability was examined using Cronbach's alpha. The 35-item questionnaire obtained a coefficient of 0.901, indicating strong internal consistency among the questionnaire items (Zakariya, 2022). The full questionnaire is provided as a supplementary file.

Approximately three months after the programme, six participants were randomly selected from the 36 instructors for follow-up semi-structured interviews. As the interviews were designed to provide qualitative follow-up evidence for the questionnaire findings, six interviewees were considered suitable

for generating early thematic insights within a clearly bounded participant group (Hennink & Kaiser, 2022). This interval allowed participants time to try selected ISTTP ideas in their own teaching before reflecting on classroom use, making the interviews more suitable for examining early application than immediate post-training comments alone. This timing is consistent with the use of follow-up periods in professional development studies that examine how training is taken into practice after participants return to their working contexts (Button et al., 2023). The interviews explored how participants applied programme ideas in their teaching, what difficulties they experienced during early classroom use, and what support or adjustments were still needed. This qualitative follow-up directly supported the third research question, which examined how participants' feedback helped refine the ISTTP.

The follow-up interview protocol was also reviewed by three subject matter experts for content validity, and all questions achieved an Item-Level Content Validity Index of 1.00. Expert rating consistency was checked through inter-rater reliability analysis. Member checking was conducted after the interviews to strengthen trustworthiness, with participants invited to review relevant excerpts or summary points of their responses and confirm whether their views had been accurately represented (Motulsky, 2021; McKim, 2023). The follow-up interview protocol is provided as a supplementary file.

3.4 Data Analysis

Quantitative data were analysed using descriptive statistics to identify patterns in participants' ratings across the seven sessions and five practicality dimensions. Frequencies, percentages, means, and standard deviations were used to summarise response patterns and to show how participants rated different aspects of the ISTTP. These results provided a quantitative basis for identifying areas that required closer interpretation through the follow-up interview data. The questionnaire results were used as early signals of which parts of the ISTTP appeared more secure and which parts required stronger support for classroom use.

Qualitative data from the follow-up interviews were analysed through thematic analysis, following Braun and Clarke's (2006, 2021) six-phase framework. A combined inductive and deductive approach was used. Initial codes captured recurring concerns about classroom application, including uncertainty in using student-centred strategies, managing activities within limited time, adapting examples to disciplinary contexts, and working within existing assessment conditions. These codes were then grouped into broader categories that reflected participants' challenges and support needs. Quantitative and qualitative findings were also integrated through a joint display to connect immediate practicality ratings with later classroom-use evidence. The themes were reviewed across the dataset to ensure that they reflected participants' reported experiences.

Quantitative and qualitative findings were integrated at the interpretation stage through a joint display. Questionnaire results were used to identify sessions and practicality dimensions that required further attention, while interview themes

were used to explain why these areas needed support during classroom use. This integration supported meta-inferences about which parts of the ISTTP were perceived as practical and which parts required further refinement. To enhance trustworthiness, part of the coded interview data was reviewed by a second researcher, which helped strengthen the transparency and consistency of the analysis (Bingham, 2023; Enworo, 2023). Member checking was also used for the follow-up interview data, allowing participants to confirm whether their views had been accurately represented.

3.5 Ethical Considerations

Ethical considerations were addressed throughout the study. Participants were informed about the purpose of the research, the data collection procedures, and their right to withdraw from the study. Participation was voluntary, and informed consent was obtained before data collection. Questionnaire responses and interview data were treated confidentially. Identifying information was removed during data analysis and reporting, and participant codes were used instead of real names. The data were used only for academic research purposes.

4. Results and Findings

4.1 Needs Analysis Phase

The needs analysis phase provided the empirical basis for developing the ISTTP. It identified the main areas in which university instructors needed structured support in teaching and assessment. The evidence pointed to recurring needs in student-centred teaching, assessment-related practice, and classroom application. In teaching, the findings showed that teachers needed support to use student-centred approaches in workable ways in everyday university classrooms. This included differentiated instruction, inquiry-based learning, and collaborative learning.

In assessment, the findings suggested continued reliance on conventional assessment formats and limited use of self-assessment, reflection, and feedback in regular teaching. The evidence also showed a need for practical examples, structured activities, and clearer guidance for applying training ideas within disciplinary and institutional contexts. These needs shaped the structure and content of the ISTTP. The programme was designed around two related areas of professional learning: student-centred teaching practice and assessment-related practice. Seven training topics were selected and organised into the programme design. Table 2 summarises the relationship between the identified need areas and the design response in the ISTTP.

Table 2: Identified need areas and design response in the ISTTP

Identified Need Area	Design Response in the ISTTP
Student-centred teaching practice	Topics on student-centred learning, differentiated instruction, inquiry, and collaborative learning
Assessment-related practice	Topics on assessment strategies, self-assessment and reflection, and feedback
Support for classroom application	Practical examples, structured activities, and context-sensitive tasks to support later classroom use

As shown in Table 2, the needs analysis established the rationale for the programme and guided the design and development decisions described in the next section.

4.2 Design and Development Phase

Based on the needs analysis, the ISTTP was designed as a structured two-day programme covering two related areas of professional learning: student-centred teaching practice and assessment-related practice. The identified needs guided the selection and sequencing of seven topics. As shown in Figure 1, the programme structure linked teaching design with assessment practice, allowing the ISTTP to respond to local needs in an integrated way.

The student-centred teaching part included four topics: understanding student-centred learning, differentiated instruction, fostering curiosity and inquiry, and collaborative learning. These topics supported teachers in developing more active, participatory, and context-responsive classroom approaches. They addressed areas where teachers needed stronger support in teaching design and classroom interaction.

The assessment-related part included three topics: assessment strategies and multiple assessment methods, self-assessment and reflection, and feedback. These topics responded to the need for broader assessment practices beyond conventional examination-oriented approaches. They aimed to strengthen teachers' use of assessment as part of the learning process.

Figure 1 shows how the two parts of the programme were connected. The teaching-related topics provided a pedagogical basis for the assessment-related topics, while the assessment-related topics supported the classroom use of student-centred teaching. The ISTTP was therefore designed as an integrated programme in which teaching and assessment were treated as related dimensions of professional development. Its structure gave the programme coherence, while the materials and activities allowed adaptation across teaching contexts and disciplines.

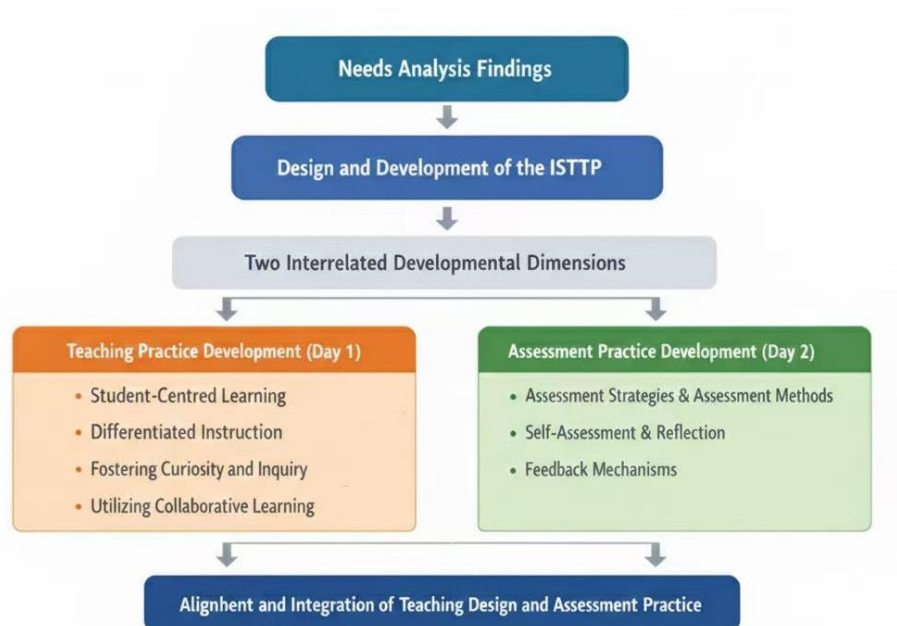


Figure 1: Structure of the in-service teacher training programme

4.3 Evaluation and Refinement Phase

The evaluation and refinement phase examined participants' immediate views of the ISTTP and their later classroom use of the programme ideas. Two sources of participant feedback were used: the questionnaire completed after the training and the follow-up interviews conducted three months later. The questionnaire findings were reviewed at topic level and by practicality dimension, while the interview findings were used to explain the conditions that shaped early classroom use and later refinement.

4.3.1 Participants' Feedback on the Practicality of the ISTTP

Participants' feedback on the practicality of the ISTTP was examined through a questionnaire completed by all 36 teacher-participants at the end of the two-day programme. The questionnaire assessed five dimensions in each session: classroom relevance, connection to prior teaching experience, clarity of examples for classroom use, usefulness of activities for practice, and potential for use in participants' own teaching. The full questionnaire is provided as a supplementary file.

Table 3: Participants' quantitative ratings of ISTTP session practicality by dimension (N = 36)

Session	Mean Score	Classroom Relevance	Connection to Prior Teaching Experience	Clarity of Examples for Classroom Use	Usefulness of Activities for Practice	Potential for Use in Own Teaching
Understanding & Implementing Student-Centred Learning (SCL)	3.93	4.00	4.06	3.81	3.81	4.00
Differentiated Instruction	4.29	4.36	4.33	4.19	4.28	4.28
Fostering Inquiry	4.21	4.28	4.25	4.17	4.19	4.17
Collaborative Learning	3.84	4.06	4.11	3.72	3.78	3.56
Assessment Strategies & Multiple Methods	3.82	4.00	4.00	3.86	3.67	3.56
Self-Assessment & Reflection	3.88	4.00	4.14	3.81	3.83	3.61
Feedback Mechanism	4.09	4.14	4.17	4.06	4.03	4.06

Note. Responses were based on a five-point Likert scale, where 1 = strongly disagree and 5 = strongly agree. Mean scores and SDs were calculated from the five items under each topic. Percentages show the distribution of participants across the five response categories.

As shown in Table 3, participants' ratings were positive across the seven topics. Mean scores ranged from 3.82 to 4.29, and SD values ranged from 0.33 to 0.47. Since Likert-scale results are better interpreted through both central tendency and response distribution, the low SD values and the concentration of responses at scale point 4 suggest a broadly consistent response pattern (Sullivan & Artino, 2013; Zimba & Gasparyan, 2023). No participants selected scale points 1 or 2, indicating that none of the topics was rejected immediately after the training. The main pattern was a difference in perceived readiness for classroom use.

Differentiated Instruction (M = 4.29, SD = 0.47), Fostering Inquiry (M = 4.21, SD = 0.35), and Feedback Mechanism (M = 4.09, SD = 0.40) were rated more strongly. By comparison, Assessment Strategies and Multiple Methods (M = 3.82, SD = 0.34), Collaborative Learning (M = 3.84, SD = 0.41), Self-Assessment and Reflection (M = 3.88, SD = 0.40), and Understanding and Implementing SCL (M = 3.93, SD = 0.33) remained positive but showed more neutral responses, ranging from 11.11% to 16.67%. This suggests that participants generally accepted the ISTTP, but some topics required clearer support for classroom use.

Table 4: Participants' quantitative ratings of ISTTP session practicality by dimension (N = 36)

Session	Classroom Relevance	Connection to Prior Teaching Experience	Clarity of Examples for Classroom Use	Usefulness of Activities for Practice	Potential for Use in Own Teaching
Understanding & Implementing (Student-Centred Learning) SCL	4.00	4.06	3.81	3.81	4.00
Differentiated Instruction	4.36	4.33	4.19	4.28	4.28
Fostering Inquiry	4.28	4.25	4.17	4.19	4.17
Collaborative Learning	4.06	4.11	3.72	3.78	3.56
Assessment Strategies & Multiple Methods	4.00	4.00	3.86	3.67	3.56
Self-Assessment & Reflection	4.00	4.14	3.81	3.83	3.61
Feedback Mechanism	4.14	4.17	4.06	4.03	4.06

Note. Values represent mean scores for each dimension within each session, based on participants' responses on a five-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The five dimensions correspond to the five questionnaire items used in each session: classroom relevance, connection to prior teaching experience, clarity of examples for classroom use, usefulness of activities for practice, and potential for use in participants' own teaching.

Table 4 shows that participants rated classroom relevance and connection to prior teaching experience positively across all sessions. The weaker scores were concentrated in the dimensions most directly related to classroom application: clarity of examples, usefulness of activities, and potential for use in participants' own teaching. This indicates that the issue was not whether the ISTTP was relevant, but whether participants had enough concrete support to use some ideas in their own classrooms.

This pattern was most visible in Collaborative Learning, Assessment Strategies and Multiple Methods, Self-Assessment and Reflection, and Understanding and Implementing SCL. Collaborative Learning showed weaker ratings for clarity of examples ($M = 3.72$), usefulness of activities ($M = 3.78$), and potential for use ($M = 3.56$). Assessment Strategies and Multiple Methods showed weaker ratings for usefulness of activities ($M = 3.67$) and potential for use ($M = 3.56$). Self-Assessment and Reflection showed a similar application-related pattern, while Understanding and Implementing SCL received lower ratings for examples and activities ($M = 3.81$ for both). These patterns guided the follow-up interview analysis.

4.3.2 Participants' Feedback on Classroom Application

To examine how the practicality signals in the questionnaire appeared in later teaching, follow-up interviews were conducted about three months after the training. The interviews were guided by the protocol provided as a supplementary file. The focus was on how participants used workshop ideas in their own teaching and what constraints shaped that process.

(a) Challenges in Classroom Application

The interview findings showed that classroom application was shaped by three main conditions: facilitation judgement, lesson time, and student readiness. These challenges were less about rejecting the ideas introduced in the ISTTP and more about using them under real classroom conditions.

a.1 Facilitation Judgement

A major issue concerned facilitation. Participants were unsure how to balance guidance and autonomy when using student-centred activities. As one participant explained, "If I control too much, the activity feels teacher-centred again." (P3) Another participant similarly noted, "I understand the principles, but in the moment of teaching I still fall back to lecturing when I feel nervous or when students look confused." (P1) These did not suggest disagreement with student-centred principles. Instead, they showed that participants needed more confidence in making facilitation decisions during live classroom interaction. This helps explain why Understanding and Implementing SCL required more support in examples and practice activities. Participants needed concrete models of how student-centred facilitation could be managed during real lessons.

a.2 Lesson Time

Time pressure was another clear difficulty. Interactive strategies, especially collaborative learning, were often seen as taking more time than traditional lecturing. One participant commented, "I sometimes feel I rush the discussion just to finish the planned content." (P5) Another participant similarly noted, "With limited contact hours, it is not always easy to support every student equally." (P6) These responses show that time pressure affected both the pacing of classroom discussion and the teacher's ability to support students during interactive tasks. This explains the lower application-related ratings for Collaborative Learning. The issue was not the value of collaborative learning itself, but whether teachers had enough structured support to manage interaction within normal class time.

a.3 Student readiness

Student culture also affected classroom use. Several participants noted that their students were not immediately comfortable with participatory formats. As one participant said, "Some students are afraid of making mistakes in front of others, which limits participation." (P4) Another participant similarly observed, "Some students still expect the teacher to explain everything clearly and correct every mistake." (P2) These responses show that classroom application depended partly on students' readiness to take a more active role, not only on teachers' willingness to use new strategies. Students' fear of making mistakes and reliance on teacher

explanation made participatory learning more difficult to sustain during early classroom use.

Therefore, these challenges help explain why some practice-related questionnaire scores were comparatively lower, especially for topics requiring active interaction, facilitation decisions, and classroom adaptation.

(b) Suggestions for Strengthening Support

When reflecting on classroom use three months later, participants also identified several forms of support that could strengthen future use of the ISTTP.

b.1 Need for More Contextualised Resources

One recurring suggestion concerned the need for more practical and context-sensitive resources. Participants did not ask for additional theoretical content; instead, they wanted materials that could be adapted directly to their own classrooms. One participant suggested that “the ISTTP could be improved by providing more small, ready-to-use tools, for example a bank of discussion prompts or reflection questions” (P1). Another participant emphasised disciplinary relevance, stating that “the ISTTP could be improved by including more discipline-specific examples, especially showing how student-centred approaches work with primary sources” (P4). These responses show that participants needed resources that could make classroom application more concrete, manageable, and relevant to different subject contexts. Examples linked to teachers’ own teaching materials and classroom tasks were especially important for helping them use general student-centred ideas in their own disciplines.

b.2 Need for Ongoing Peer Support

Participants also emphasised the value of continued peer exchange and follow-up support. One participant commented, “I hope the programme can create a small community or online space where participants from different departments share lesson ideas” (P3). P3). Another participant similarly suggested that “some form of follow-up support, such as workshops or an online sharing space, would help teachers exchange ideas and reflect on challenges as they continue to experiment” (P6). These suggest that classroom use of programme ideas was not viewed as an individual matter only. Ongoing dialogue with colleagues was seen as a useful way to build confidence, adapt strategies across contexts, and work through practical uncertainties after the workshop.

b.3 Need for More Practice Opportunities

Another suggestion concerned the need for further opportunities to practise specific teaching strategies after the initial training. Participants indicated that some classroom challenges became clearer only when they tried to use the ISTTP ideas in their own teaching. One participant stated, “If there were optional micro-workshops later in the year, for example just on questioning techniques or managing group work, I would definitely join” (P2). Another participant similarly suggested that “short follow-up sessions focused on specific challenges, such as managing discussion or supporting hesitant students, would be useful for continued development” (P5). These responses show that participants needed

continued, practice-focused support to refine specific teaching moves and build confidence during classroom use.

Overall, participants' suggestions pointed to support beyond the two-day training itself. The main refinement needs concerned contextualised resources, peer-based follow-up, and further practice opportunities that could support classroom application over time.

4.3.3 Cross-Source Design Signals Informing Programme Refinement

The questionnaire results and follow-up interviews were considered together to identify refinement priorities. The questionnaire showed where participants were less certain about practicality, while the interviews explained the classroom conditions behind those patterns.

Table 5: Joint display of cross-source signals and refinement implications

Key Domain	Quantitative Signal (Survey)	Qualitative Insight (Reported Challenges)	Implication for Refinement
Collaborative Learning	Lower ratings for examples (3.72), activities (3.78), and classroom use (3.56)	Time pressure and difficulty managing interaction	Introduce more tightly structured collaborative formats with clearer task steps, role allocation, and time-bounded procedures.
Student-Centred Learning (SCL)	Lower ratings for examples (3.81) and activities (3.81)	Uncertainty about balancing guidance and autonomy	Provide clearer facilitation guidance through model activity formats, worked examples, and practical prompts.
Assessment and Feedback-Related Practice	Lower ratings for activities (3.67) and classroom use (3.56)	Difficulty adapting formative ideas within exam-oriented structures	Strengthen support for adaptation within existing institutional conditions by showing how formative assessment, self-assessment, reflection, and feedback can be incorporated into current assessment arrangements.
Cross-Disciplinary Application	Weaker classroom-use signals across some sessions	Participants needed examples and resources that reflected different subject materials, tasks, and classroom formats	Expand the range of examples and support materials so that participants can see how the key ideas may be adapted across different disciplines, including text-based, content-heavy, and practice-based teaching contexts.

Note. The data-based implications for refinement were derived from the integrated analysis of questionnaire results and follow-up interview findings. They represent the authors' interpretation within the DDR refinement process, rather than direct recommendations from the literature.

Table 5 shows how the two datasets worked together. Collaborative Learning was affected mainly by time and interaction management. Student-Centred Learning was affected by facilitation judgement. Assessment and reflection-related topics were affected by the fit between training ideas and existing course structures. Cross-disciplinary application was reflected in participants' need for examples and tools that matched different subject materials, classroom tasks, and teaching formats.

The refinement decisions followed this cross-source pattern. Collaborative Learning was strengthened through task templates, classroom flow guides, participation role sheets, and teacher checklists. Student-Centred Learning was strengthened through first-use guidance and practical prompts. Assessment Strategies and Self-Assessment and Reflection were strengthened through adaptation tools, reflection prompts, learning log templates, and practice-oriented worksheets. Follow-up support through peer exchange, mentoring, consultation, and practice workshops was also strengthened.

Overall, the evaluation and refinement phase showed that the ISTTP was perceived positively, but its practicality depended on how well participants could use training ideas in their own teaching conditions. The findings therefore moved beyond general satisfaction by showing which topics needed further support, why these needs emerged, and how the ISTTP was refined in response.

5. Discussion

5.1 Discussion of the Design and Development of the ISTTP

The design and development of the ISTTP were strengthened by its local starting point. The needs analysis showed that teachers required support in student-centred teaching, assessment-related practice, and classroom application. This finding is consistent with evidence that professional development is more useful when it addresses lecturers' identified needs and connects with their actual teaching work (Aishath et al., 2021; Brown et al., 2026). In this study, the needs analysis shaped the logic of the ISTTP by showing that teachers needed a programme that was accessible within the institution and usable in their own courses.

The seven-topic, two-day structure gave the ISTTP coherence by linking student-centred teaching practice with assessment-related practice, which helped avoid treating teaching and assessment as separate training areas. This structure was important because student-centred teaching is difficult to sustain when assessment practices remain unchanged. The findings support recent work showing that professional learning in higher education is strengthened when it is context-sensitive and organised around connected practices (Parker et al., 2024; Stevens et al., 2024). Even as a short institutional programme, the ISTTP had coherence because its sessions were organised around the relationship between teaching, assessment, and classroom use.

Design and Development Research (DDR) approach also supported the local development of the programme by connecting needs analysis, programme

design, pilot refinement, participant feedback, and later refinement within one development process. This aligns with design-based and development-oriented research that treats programme design as a response to real educational problems in specific settings (Hoadley & Campos, 2022; Bélisle et al., 2024; Järnerot, 2025; Smith & Wyness, 2025). The value of DDR in this study was therefore more than procedural. It provided a way to build practical knowledge from local evidence and refine the ISTTP in response to participants' classroom experiences.

5.2 Discussion of the Practicality of the ISTTP Reflected in Participants' Feedback

Participants generally perceived the ISTTP as practical and relevant to university teaching. The positive ratings across the seven sessions indicate that participants could connect the programme with their own teaching work. This matters because practicality was treated as more than general satisfaction. It referred to whether participants saw the sessions as relevant, clear, useful, and potentially usable in their own classrooms. Professional development in higher education is more likely to be meaningful when teachers see a clear link between training content, classroom realities, and emerging pedagogical demands, including technology-related changes to teacher roles (Fernandes et al., 2023; O'Brien et al., 2023; Taufikin et al., 2024).

The stronger ratings for Differentiated Instruction and Fostering Inquiry suggest that these topics were more immediately usable for participants. By comparison, Collaborative Learning, Assessment Strategies and Multiple Methods, and Self-Assessment and Reflection, especially for examples, activities, and potential for application. These lower ratings did not indicate negative views of the topics. They showed that participants needed more concrete support to use these ideas under regular teaching conditions.

This pattern helps explain why practicality cannot be understood only as positive reaction to training. Some topics may appear relevant at the end of a programme, but their use depends on classroom time, student readiness, assessment arrangements, and teachers' confidence in managing interaction. This is consistent with training transfer research, which shows that professional development outcomes depend on the fit between training design, participant readiness, and the work environment (Baldwin & Ford, 1988; Donath et al., 2025; Nimante et al., 2025). Zhou and Delogu (2026) similarly show that professional development in Chinese higher education is shaped by contextual factors. The present findings add to this literature by showing that the less secure parts of the ISTTP were mainly located in the movement from understanding to classroom use. Practicality in university teacher development therefore needs to be examined through both perceived relevance and classroom readiness.

5.3 Discussion of How Participants' Feedback Helped Refine the ISTTP

Participants' feedback helped refine the ISTTP by showing that immediate responses after training could not fully explain how the programme would work in classrooms. The questionnaire provided early signals of practicality, while the follow-up interviews explained the conditions that shaped classroom use. This two-stage feedback process separated initial acceptance from later usability and

showed why refinement was still needed after positive post-training responses (Chen et al., 2025; Donath et al., 2025).

The follow-up interviews showed that classroom use was shaped by facilitation judgement, limited lesson time, student readiness, disciplinary materials, and institutional routines. These findings shifted the refinement focus from adding more content to improving the conditions for use. This interpretation aligns with Motseta et al. (2025), who argue that professional development becomes more useful when it responds to subject, teacher, learner, and institutional conditions.

The integration of questionnaire and interview evidence produced a clearer refinement logic. The questionnaire showed where participants were less certain about practicality, while the interviews explained why these weaker signals appeared and what forms of support were needed. The resulting refinements focused on structured activity formats, concrete examples, discipline-sensitive resources, peer-based follow-up, and further practice opportunities. Recent studies similarly emphasise that continuing feedback can support programme improvement and teacher development over time (Murray et al., 2025; Lee et al., 2026; van der Baan et al., 2026). In this study, participant feedback served not only as evaluation evidence but as a basis for identifying the conditions that made classroom use more possible.

5.4 Significance of the Study

This study is significant for DDR-informed programme development in higher education because it shows how an In-Service Teacher Training Programme (ISTTP) can be developed through a locally grounded and evidence-informed process. The findings show that needs analysis, programme structure, pilot refinement, participant feedback, and later refinement can work as connected parts of one development process, which is consistent with the use of design-based approaches in educational programme development (Hoadley & Campos, 2022; Peters-Burton et al., 2024). The scholarly significance of the study lies in showing how DDR can generate practical programme knowledge within a real institutional setting, where programme design, evaluation, and refinement operate as a connected process rather than as separate activities.

The study is also significant for the evaluation of professional development in university teaching. It distinguishes between perceived relevance and classroom readiness, showing that a programme can be valued by instructors while still requiring further support for classroom use. This distinction offers a more precise way to examine practicality in teacher development, since it considers both participants' perceived value of the training and their ability to recognise how the training may be used in their own teaching conditions.

In this sense, participant feedback can serve as evaluation evidence and as a basis for programme improvement, which aligns with recent work on effective professional development in higher education (Stevens et al., 2024; Smith & Wyness, 2025)).

The study further has institutional significance for lecturer development through localisation. At Yan'an University, earlier high-value opportunities, including overseas training, reached only a small group of instructors. The ISTTP shows how selected professional learning ideas can be adapted into a more inclusive and repeatable local programme for wider lecturer participation. This is especially relevant for institutions where professional development opportunities are unevenly distributed. The study therefore points to a more inclusive model of university instructor development under local institutional conditions, reflecting the concern captured in the title, *No Lecturer Left Behind* (Wang et al., 2021; Li et al., 2023; Yuan & Gao, 2023).

5.5 Limitations and Suggestions for Future Research

This study has several limitations. It was conducted in one public university in China, so the findings are closely linked to this institutional context. The analysis also focused on participants' immediate feedback and early classroom use, with less attention to longer-term changes in teaching and assessment practice. Although participant feedback informed the refinement of the ISTTP, the latest refinements have not yet been examined through another cycle of use and review. The study also relied mainly on participants' questionnaire responses and follow-up interview accounts. It did not include students' perspectives or classroom observation evidence, even though student readiness appeared as an important issue in participants' accounts.

Future research could examine the refined ISTTP in other university contexts and follow later cycles of use over a longer period. Future studies could also include classroom observations, student perspectives, and cross-disciplinary comparisons to examine how the refined ISTTP is used in practice. Further studies could explore which forms of post-training support, such as peer exchange, mentoring, micro-workshops, or discipline-specific follow-up, are most useful for sustaining student-centred teaching and assessment practices over time.

6. Conclusion

This study examined the design, development, evaluation, and refinement of an In-Service Teacher Training Programme (ISTTP) at Yan'an University, a public university in China. Guided by Design and Development Research, it showed how identified teaching needs could be organised into a coherent programme structure linking student-centred teaching and assessment-related practice, and how participant feedback could support further refinement after programme use. The value of the ISTTP therefore lay not only in its training content, but in showing how selective professional learning could be converted into a more inclusive, institution-based programme for a broader group of lecturers. At the same time, the findings clarified that practicality should not be understood only as positive immediate feedback. Although participants viewed the ISTTP as relevant and useful, classroom use was shaped by facilitation confidence, lesson time, student readiness, disciplinary fit, and institutional conditions. These findings suggest that professional development in higher education needs to support teachers' movement from understanding new ideas to using them in their own teaching contexts. A localised ISTTP can therefore serve as a practical

mechanism for building more inclusive, responsive, and context-sensitive teacher development in higher education.

Conflict of Interest

The authors declare no conflict of interest.

7. Acknowledgments

The authors would like to thank the participating faculty members and trainers for their valuable contributions to this study. We sincerely acknowledge Associate Professor Siew Eng Lin for her academic guidance and continuous support throughout the research process. Appreciation is also extended to colleagues at the Faculty Development Centre of Yan'an University for their professional assistance in organising and facilitating the programme. Institutional support from UCSI University and Yan'an University is gratefully acknowledged.

8. Declaration for the Use of Generative Artificial Intelligence (AI)

The author used generative artificial intelligence tools to assist with language polishing, structural refinement, and clarity of expression during the preparation of this manuscript. Generative artificial intelligence tools were used only for limited language editing and refinement of expression. The intellectual content of this manuscript, including the research design, data collection, data analysis, interpretation of findings, and development of arguments, remains entirely the author's own responsibility. All ideas, conclusions, and original contributions presented in this manuscript are solely the author's own work.

9. References

- Acuyo, A. (2021). Reviewing the literature on professional development for higher education tutors in the work-from-home era: Is it time to reconsider the integration of social media? *Education and Information Technologies*, 27(1), 89–113. <https://doi.org/10.1007/s10639-021-10603-2>
- Adeoye-Olatunde, O. A., & Olenik, N. L. (2021). Research and scholarly methods: Semi-structured interviews. *Journal of the American College of Clinical Pharmacy*, 4(10), 1358–1367. <https://doi.org/10.1002/jac5.1441>
- Aishath, Z., Omar, I. M., & Aishath, W. (2021). Correlation between lecturers' professional development activities and their competencies in Maldives higher education institutes. *International Journal of Learning, Teaching and Educational Research*, 20(9). <https://doi.org/10.26803/ijlter.20.9.2>
- Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology*, 41(1), 63–105. <https://doi.org/10.1111/j.1744-6570.1988.tb00632.x>
- Bélisle, M., Lison, C., & Bédard, D. (2024). The educational development of university teachers. *Frontiers in Education*, 9, Article 1376658. <https://doi.org/10.3389/feduc.2024.1376658>
- Bergmark, U. (2023). Teachers' professional learning when building a research-based education: Context-specific, collaborative and teacher-driven professional development. *Professional Development in Education*, 49(2), 210–224. <https://doi.org/10.1080/19415257.2020.1827011>
- Besekar, S., Jogdand, S., & Naqvi, W. (2024). Exploring sample size determination in educational research: A comprehensive review. *F1000Research*, 12, Article 1291. <https://doi.org/10.12688/f1000research.141173.3>

- Bingham, A. J. (2023). From Data Management to Actionable Findings: A Five-Phase Process of Qualitative Data Analysis. *International Journal of Qualitative Methods*, 22, 1–11. <https://doi.org/10.1177/16094069231183620>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE. <https://doi.org/10.58837/CHULA.PPJ.39.8>
- Brown, K., Petchey, S., Mårtensson, K., & Niebert, K. (2026). Self-identified learning needs of university teachers: Recommendations for generic and role-based professional development. *International Journal for Academic Development*, 31(1), 102–115. <https://doi.org/10.1080/1360144X.2025.2553193>
- Button, B. L. G., Cook, C., & Goertzen, J. (2023). Impact of a professional development session based on learner evaluations within a preceptor community of practice. *Medical Teacher*, 45(7), 732–739. <https://doi.org/10.1080/0142159X.2022.2155121>
- Chen, J., Du, X., Bandi, S., de Carvalho Guerra, A. O. P., Hansen, S., & Joshi, G. (2025). Exploring university educators' readiness for changing to PBL: A case from India. *International Journal for Academic Development*, 1–17. <https://doi.org/10.1080/1360144X.2025.2574982>
- Chen, Y. (2025). Ready for the changes? Exploring EAP teachers' competencies and training needs in tertiary level in China. *Frontiers in Education*, 10, 1707419. <https://doi.org/10.3389/feduc.2025.1707419>
- Dalawi, I., Isa, M. R., Chen, X. W., Azhar, Z. I., & Aimran, N. (2023). Development of the Malay language of understanding, attitude, practice and health literacy questionnaire on COVID-19: Content validity & face validity analysis. *BMC Public Health*, 23, Article 1132. <https://doi.org/10.1186/s12889-023-16044-5>
- Donath, J. L., Lüke, T., Tran, U. S., Botes, E., & Götz, T. (2025). The transfer of teacher training to inclusive classroom practice: A meta-analytic SEM approach. *Educational Psychology Review*, 37, Article 105. <https://doi.org/10.1007/s10648-025-10081-9>
- Enworo, O. C. (2023). Application of Guba and Lincoln's parallel criteria to assess trustworthiness of qualitative research on indigenous social protection systems. *Qualitative Research Journal*, 23(4), 372–384. <https://doi.org/10.1108/QRJ-08-2022-0116>
- Fernandes, S., Araújo, A. M., Miguel, I., & Abelha, M. (2023). Teacher professional development in higher education: The impact of pedagogical training perceived by teachers. *Education Sciences*, 13(3), 309. <https://doi.org/10.3390/educsci13030309>
- Garone, A., Bruggeman, B., Philipsen, B., & Pynoo, B. (2022). Evaluating professional development for blended learning in higher education: A synthesis of qualitative evidence. *Education and Information Technologies*, 27, 7599–7628. <https://doi.org/10.1007/s10639-022-10928-6>
- Gong, Y., MacPhail, A., & Guberman, A. (2023). Professional learning and development needs of Chinese university-based physical education teacher educators. *European Journal of Teacher Education*, 46(1), 154–170. <https://doi.org/10.1080/02619768.2021.1892638>
- Gu, N., Donovan, L., Green, T., Ma, S., & Currie, D.-J. (2023). Higher education faculty concerns teaching in a hybrid environment: Implications for Chinese private higher education faculty developers and faculty. *International Journal of Professional Development, Learners and Learning*, 5(1), Article ep2302. <https://doi.org/10.30935/ijpdll/12638>
- Guskey, T. R. (2002). Professional development and teacher change. *Teachers and Teaching*, 8(3), 381–391. <https://doi.org/10.1080/135406002100000512>

- Hennink, M., & Kaiser, B. N. (2022). Sample sizes for saturation in qualitative research: A systematic review of empirical tests. *Social Science & Medicine*, 292, Article 114523. <https://doi.org/10.1016/j.socscimed.2021.114523>
- Hoadley, C., & Campos, F. C. (2022). Design-based research: What it is and why it matters to studying online learning. *Educational Psychologist*, 57(3), 207–220. <https://doi.org/10.1080/00461520.2022.2079128>
- Järnerot, A. J. (2025). Designing higher education to promote more time on studies and divergent learning outcomes: An instructional designer's perspective. *Frontiers in Education*, 10, Article 1697114. <https://doi.org/10.3389/feduc.2025.1697114>
- Johanson, G. A., & Brooks, G. P. (2010). Initial scale development: Sample size for pilot studies. *Educational and Psychological Measurement*, 70(3), 394–400. <https://doi.org/10.1177/0013164409355692>
- Kunselman, A. R. (2024). A brief overview of pilot studies and their sample size justification. *Fertility and Sterility*, 121(6), 899–901. <https://doi.org/10.1016/j.fertnstert.2024.01.040>
- Lee, O., Haas, A., Schwenger, A., & Grapin, S. (2026). Teacher feedback guiding professional development programs: A 2-year field trial integrating science and language with multilingual learners. *Journal of Science Teacher Education*, 37(2), 297–316. <https://doi.org/10.1080/1046560X.2025.2547419>
- Li, B., Yang, F., & Wang, Q. (2023). Policies, strategies, and the evolutionary logic of large-scale teacher training in China. *ECNU Review of Education*, 6(3), 451–468. <https://doi.org/10.1177/20965311231167195>
- McKenney, S., & Reeves, T. C. (2021). Educational design research: Portraying, conducting, and enhancing productive scholarship. *Medical Education*, 55(1), 82–92. <https://doi.org/10.1111/medu.14280>
- McKenney, S., & Reeves, T. C. (2025). Educational design research for relevant and robust scholarship. *Journal of Computing in Higher Education*, 37(2), 614–638. <https://doi.org/10.1007/s12528-025-09456-2>
- McKim, C. (2023). Meaningful member-checking: A structured approach to member-checking. *American Journal of Qualitative Research*, 7(2), 41–52. <https://doi.org/10.29333/ajqr/12888>
- Merrill, M. D. (2002). First principles of instruction. *Educational Technology Research and Development*, 50(3), 43–59. <https://doi.org/10.1007/BF02505024>
- Merrill, M. D. (2012). First principles of instruction: Identifying and designing effective, efficient, and engaging instruction. Wiley. <https://www.wiley.com/en-us/shop/general-introductory-business-management/first-principles-of-instruction-p-9780470900406>
- Ministry of Education of the People's Republic of China. (2019, February 23). 中国教育现代化 2035 [China's education modernization 2035]. https://www.moe.gov.cn/jyb_xwfb/s6052/moe_838/201902/t20190223_370857.html
- Motseta, L. L., Mdodana-Zide, L., Mahome, M. M., & van Wyk, M. M. (2025). Context-specific professional development for business studies educators. *International Journal of Learning, Teaching and Educational Research*, 24(8). <https://doi.org/10.26803/ijlter.24.8.23>
- Motulsky, S. L. (2021). Is member checking the gold standard of quality in qualitative research? *Qualitative Psychology*, 8(3), 389–406. <https://doi.org/10.1037/qup0000215>
- Murray, E., Leonard, H. S., & Bonaccorso, V. D. (2025). Teacher growth through professional development centered on the teaching for robust understanding framework. *Education Sciences*, 15(1), 18. <https://doi.org/10.3390/educsci15010018>

- Nieveen, N., & Folmer, E. (2013). Formative evaluation in educational design research. In T. Plomp & N. Nieveen (Eds.), *Educational design research: Part A: An introduction* (pp. 152–169). SLO. <https://slo.nl/publish/pages/2904/educational-design-research-part-a.pdf>
- Nimante, D., Kokare, M., Baranova, S., & Surikova, S. (2025). Transferring results of professional development into practice: A scoping review. *Education Sciences*, 15(1), 95. <https://doi.org/10.3390/educsci15010095>
- O'Brien, E., Moore, G., Costelloe, L., & O'Sullivan, Í. (2023). Professional development practices and preferences in Irish higher education: Insights from a regional survey. *International Journal for Academic Development*, 28(3), 240–257. <https://doi.org/10.1080/1360144X.2022.2036155>
- Orfali, C. H., Arancibia Muñoz, M. L., Riquelme Plaza, I., & Unda Valenzuela, R. (2024). How higher education teachers see their professional identity. *Frontiers in Education*, 9, Article 1429847. <https://doi.org/10.3389/feduc.2024.1429847>
- Owusu-Agyeman, Y. (2024). Using multilevel mentoring as a situated learning approach to enhance the professional development of teachers in higher education. *Journal of Professional Capital and Community*, 9(1), 19–36. <https://doi.org/10.1108/JPC-03-2023-0016>
- Parker, M. A., Walser, T. M., & Dighe, S. (2024). Academic program development: A collaborative and context-sensitive approach. *Discover Education*, 3, Article 372. <https://doi.org/10.1007/s44217-024-00377-3>
- Peters-Burton, E. E., Tran, H. H., & Miller, B. (2024). Design-based research as professional development: Outcomes of teacher participation in the development of the Science Practices Innovation Notebook (SPIN). *Journal of Science Teacher Education*, 35(3), 221–242. <https://doi.org/10.1080/1046560X.2023.2242665>
- Postareff, L., Lahdenperä, J., Hailikari, T., Virtanen, V., & Parpala, A. (2024). The dimensions of approaches to teaching in higher education: A new analysis of teaching profiles. *Higher Education*, 87, 1231–1252. <https://doi.org/10.1007/s10734-023-01104-x>
- Rana, K., & Chimoriya, R. (2025). A guide to a mixed-methods approach to healthcare research. *Encyclopedia*, 5(2), Article 51. <https://doi.org/10.3390/encyclopedia5020051>
- Richey, R. C., & Klein, J. D. (2007). *Design and development research: Methods, strategies, and issues*. Lawrence Erlbaum Associates. <https://doi.org/10.4324/9780203826034>
- Richey, R. C., & Klein, J. D. (2014). *Design and development research: Methods, strategies, and issues*. Routledge. https://doi.org/10.1007/978-1-4614-3185-5_12
- Sanches, T., & Paz, A. L. (2025). Student-centred pedagogies in post-Bologna higher education: Research trends from 2010 to 2020. *Trends in Higher Education*, 4(4), 61. <https://doi.org/10.3390/higheredu4040061>
- Silva Didier, L., Schildkamp, K., Visscher, A. J., & Bosker, R. J. (2025). Factors influencing the implementation of a teacher professional development program to improve teaching quality. *Frontiers in Education*, 10, Article 1546448. <https://doi.org/10.3389/feduc.2025.1546448>
- Sinnayah, P., Ambler, T., Kelly, K., Konjarski, L., Tangalakis, K., & Smallridge, A. (2024). Reviewing the literature: Collaborative professional learning for academics in higher education. *Innovations in Education and Teaching International*, 61(5), 862–876. <https://doi.org/10.1080/14703297.2023.2227614>
- Smith, B., & Wyness, L. (2025). What makes professional teacher development in universities effective? Lessons from an international systematised review. *Professional Development in Education*, 51(7), 1550–1572. <https://doi.org/10.1080/19415257.2024.2386666>
- Stevens, T. M., Day, I. N. Z., den Brok, P. J., Prins, F. J., Assen, H. J. H. E., ter Beek, M., ... Vermunt, J. D. (2024). Teacher professional learning and development in the

- context of educational innovations in higher education: A typology of practices. *Higher Education Research & Development*, 43(2), 437–454. <https://doi.org/10.1080/07294360.2023.2246412>
- Sukserm, P. (2024). Determining the appropriate sample size in EFL pilot studies. *Journal of Research Methodology*, 37(3), 245–264. <https://doi.org/10.14456/jrm.2024.13>
- Sullivan, G. M., & Artino, A. R., Jr. (2013). Analyzing and interpreting data from Likert-type scales. *Journal of Graduate Medical Education*, 5(4), 541–542. <https://doi.org/10.4300/JGME-5-4-18>
- Taufikin, M. S. I., Supa' At, Azifah, N., Nikmah, F., Kuanr, J., & Parminder. (2024). The impact of AI on teacher roles and pedagogy in the 21st century classroom. In *2024 International Conference on Knowledge Engineering and Communication Systems (ICKECS)* (pp. 1–5). IEEE. <https://doi.org/10.1109/ICKECS61492.2024.10617236>
- Taufikin, Supa' At, Sharma, M., Chinmulgund, A., Kuanr, J., & Fatma, G. (2024). The future of teaching: Exploring the integration of machine learning in higher education. In *2024 International Conference on Knowledge Engineering and Communication Systems (ICKECS)* (pp. 1–6). IEEE. <https://doi.org/10.1109/ICKECS61492.2024.10616421>
- Tinoca, L., Piedade, J., Santos, S., Pedro, A., & Gomes, S. (2022). Design-based research in the educational field: A systematic literature review. *Education Sciences*, 12(6), Article 410. <https://doi.org/10.3390/educsci12060410>
- van der Baan, N. A., Hennemann, T. P. J. N. B., Stalmeijer, R. E., Dolmans, D. H. J. M., & Sehlbach, C. (2026). Teachers' continuing professional development: Using student evaluations to start a dialogue. *Assessment & Evaluation in Higher Education*, 51(2), 363–378. <https://doi.org/10.1080/02602938.2025.2584136>
- Vaudrey, L., Baran, E., & Correia, A.-P. (2024). A systematic review of Merrill's First Principles of Instruction in online learning. *Educational Technology Research and Development*, 72, 1827–1858. <https://doi.org/10.1007/s11423-024-10375-3>
- Ventista, O. M., & Brown, C. (2023). Teachers' professional learning and its impact on students' learning outcomes: Findings from a systematic review. *Social Sciences & Humanities Open*, 8(1), Article 100565. <https://doi.org/10.1016/j.ssaho.2023.100565>
- Vlachopoulos, D., & Makri, A. (2024). A systematic literature review on authentic assessment in higher education: Best practices for the development of 21st century skills, and policy considerations. *Studies in Educational Evaluation*, 83, Article 101425. <https://doi.org/10.1016/j.stueduc.2024.101425>
- Wang, F., Lo, L. N. K., Chen, X., & Qin, C. (2021). Journey to the West: The overseas learning experiences of Chinese teacher educators in Canada. *Teaching and Teacher Education*, 108, Article 103509. <https://doi.org/10.1016/j.tate.2021.103509>
- Xiong, X. (2025). Influence of teaching styles of higher education teachers on students' engagement in learning: The mediating role of learning motivation. *Education for Chemical Engineers*, 51(2), 87–102. <https://doi.org/10.1016/j.ece.2025.02.005>
- Yuan, G., & Gao, Y. (2023). Factors impacting an overseas continuing professional development programme: Chinese teachers' voices. *Asia Pacific Journal of Education*, 43(1), 270–282. <https://doi.org/10.1080/02188791.2021.1918631>
- Zakariya, Y. F. (2022). Cronbach's alpha in mathematics education research: Its appropriateness, overuse, and alternatives in estimating scale reliability. *Frontiers in Psychology*, 13, Article 1074430. <https://doi.org/10.3389/fpsyg.2022.1074430>
- Zhang, H., Lyu, X., & Qiu, Y. (2024). Effective teacher professional development and its influencing factors: A cross-national comparison of the United States, China, Finland, and Singapore. *Journal of Teacher Education*, 75(5), 502–515. <https://doi.org/10.1177/00224871241254779>
- Zhou, J., & Delogu, P. (2026). Bridging EAP and EMI: Professional development for EAP teachers in Chinese higher education. *Journal of English for Academic Purposes*, 79, Article 101623. <https://doi.org/10.1016/j.jeap.2025.101623>

- Zimba, O., & Gasparyan, A. Y. (2023). Designing, conducting, and reporting survey studies: A primer for researchers. *Journal of Korean Medical Science*, 38(48), Article e403. <https://doi.org/10.3346/jkms.2023.38.e403>
- Zwolińska-Gładys, K., Lorenc, S., Kowalska, N., & Pomykała, R. (2024). Higher education staff development: A need-oriented approach based on survey research. *Scientific Reports*, 14, Article 31455. <https://doi.org/10.1038/s41598-024-83053-8>