



Students' Perceptions of Pedagogical Strategies in Vocational Teacher Education: An Explanatory Sequential Mixed-Methods Study

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ABSTRACT

Purpose: This study examined students' perceptions of pedagogical strategies in a vocational teacher education course and explored experiences underlying selected survey patterns. **Methods:** An explanatory sequential mixed-methods design involved 90 students who completed a researcher-developed 10-item questionnaire and 15 willing respondents randomly selected for semi-structured interviews. Because one item represented each pedagogical dimension and internal consistency was low (Cronbach's $\alpha = 0.295$), quantitative interpretation was limited to individual items; no composite score was interpreted. Interviews were analysed thematically and integrated with the survey findings in a joint display. **Findings:** Responses were confined to Neutral, Agree, and Strongly Agree, and all items had a median of 4.00. Active discussion, collaborative learning, and technology use were generally viewed affirmatively, but the narrow numerical differences among indicators were not treated as substantively meaningful. Interview accounts described collaboration as supporting discussion and peer assistance, while indicating expectations for more specific, actionable feedback and assessment tasks more closely connected with vocational practice. Acquiescence and social desirability bias cannot be excluded given the restricted response distribution. **Research Implications:** Course evaluation should examine feedback usability and the vocational authenticity of assessment while retaining opportunities for collaborative participation. These findings concern one course and should not be interpreted as evidence of instructional effectiveness. **Originality:** Integrating item-level survey patterns with interview accounts showed how broadly affirmative responses could coexist with specific expectations for improvement, providing a context-sensitive explanation of students' pedagogical experiences in vocational teacher education.



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INTRODUCTION

Vocational education and training (VET) is expected to prepare graduates for occupational practice while enabling them to adapt to changes in technology and work organisation. This expectation places a particular responsibility on vocational teacher education because prospective teachers must learn to translate occupational knowledge into instruction, guidance, and assessment that reflect professional practice. The OECD (2023) notes that future-ready VET systems depend on current information about skill needs, engagement with social partners, and the continued development of VET teachers. At the course level, responsiveness is shaped not only by what is taught but also by how students participate, collaborate, receive feedback, use learning media, and demonstrate competence. Teaching and learning strategies are therefore central to connecting pedagogical knowledge with the work of vocational teaching.

Active and project-based approaches are frequently discussed as ways to establish this connection. Guo et al. (2020) reviewed project-based learning in higher education and organised the reported student outcomes into cognitive, affective, behavioural, and artefact performance categories. Nilsook et al. (2021) synthesised a five-stage project-based learning process for vocational and technical education. In Indonesia, Akhyar et al. (2024) developed an integrated problem- and project-based learning syntax, whereas Suhanto et al. (2024) examined learning outcomes in programmable logic controller instruction using problem-based learning with mock-up media. Taken together, these

studies show that active and project-based approaches organise learning through purposeful tasks, student participation, collaboration, and the production of observable work. Their intervention-specific focus, however, does not explain how students experience the broader combination of instructional methods, lecturer support, participation, feedback, technology, and assessment operating within a course.

Technology, feedback, assessment, and workplace connections add further dimensions to vocational learning. Tsauri et al. (2024), for example, reported that virtual reality simulation could complement, but not replace, direct practice in heavy equipment engineering. Dawson et al. (2019) found that students valued feedback that was detailed, personalised, and usable in subsequent work. In vocational assessment, Villarroel et al. (2024) identified gaps in task realism and cognitive demand by comparing teacher and student perceptions with 905 written examination questions. Workplace relevance also requires institutional arrangements. Arinaitwe (2021) found that collaboration between vocational teacher education institutions and workplaces depended on joint planning, sufficient time, and sustained participation. These studies indicate that collaboration, feedback, technology, and authentic assessment address different but related aspects of vocational learning.

Based on this literature, the study uses an integrated course-level conceptual framework comprising three related domains: instructional enactment and learner participation, formative regulation, and vocational alignment. The first domain includes variation in teaching methods, clarity of material, opportunities for discussion, practicum support, collaboration, student involvement in learning decisions, and the use of media and technology. The second is represented by feedback, which helps students interpret their performance and identify subsequent improvements. The third connects labour-market relevance with authentic assessment so that course content and demonstrations of competence remain aligned with professional practice. The ten questionnaire items were selected to represent these distinct but connected operational aspects; they were not assumed to measure a single underlying construct.

Students' perceptions provide one way of examining how these aspects are experienced, although they should not be equated with evidence of instructional effectiveness. Noguera et al. (2024) conducted a cross-sectional questionnaire study involving 460 Catalan VET students and examined the frequency, satisfaction, and preferred delivery modes of 15 teaching strategies. They found that lecturing and active learning were the most frequently experienced and preferred approaches, while situated learning was reported less frequently and was less preferred. This study offers a close comparison because it examines students' perspectives across multiple teaching strategies. Its quantitative design, however, did not include follow-up interviews that could explain why particular strategies were valued or how students interpreted the strengths and shortcomings of their learning experiences.

Within the Department of Family Welfare Education, Faculty of Engineering, Universitas Negeri Makassar, the Teaching and Learning Strategies course prepares students to design, implement, and evaluate instruction as prospective vocational teachers. The course therefore provides an appropriate setting for examining students' perceptions of teaching methods, collaborative activities, lecturer support, feedback, participation in learning decisions, technology use, labour-market relevance, and authentic assessment. Such perceptions can identify patterns in how the course is experienced and can inform course review. Nevertheless, they cannot independently establish whether a particular strategy improves achievement, engagement, or professional readiness.

The studies reviewed above leave three related gaps. Contextually, the available evidence comes from general higher education, vocational schools, or intervention-specific settings rather than from a single higher education course that prepares prospective vocational teachers. Empirically, it remains unclear how students experience the relationship among instructional participation, formative feedback, and vocational alignment within the same course, and what experiences help explain the observed item-level response patterns. Methodologically, the directly comparable study by Noguera et al. (2024) used a cross-sectional questionnaire, while the intervention and assessment studies focused on specific practices or outcomes. The gap is therefore not the general absence of mixed-methods research in vocational education, but the absence, within the literature reviewed here, of explanatory integration in a comparable course context.

To address these gaps, this study used an explanatory sequential mixed-methods design. The quantitative phase described item-level patterns in students' perceptions, while the qualitative phase explored students' experiences to help explain those patterns. Integration occurred by connecting the interview sample to the survey respondents, using the quantitative results to inform the interview guide, and comparing the two strands in a joint display to develop a meta-inference. Accordingly, this study aimed to describe students' perceptions of teaching and learning strategies in the course, explore their experiences of collaborative learning, feedback, and authentic assessment, and integrate both forms of evidence to formulate context-sensitive implications for course development. Conceptually, the study contributes a course-level explanation of how participatory learning, formative support, and vocational relevance may coexist and interact in students' experiences. Methodologically, it demonstrates how interview evidence can explain, qualify, or extend selected item-level patterns without treating the ten items as a single validated scale.

METHOD

Research Design and Setting

This study adopted an explanatory sequential mixed-methods design, in which the quantitative phase was conducted before the qualitative phase (Creswell & Plano Clark, 2018). The study began with a survey to identify general patterns in students' perceptions of the pedagogical strategies used in the *Teaching and Learning Strategies* course. The survey findings were then used to focus the interviews on aspects that required further explanation. In particular, the interviews explored why collaborative learning and active discussion received relatively high ratings, whereas feedback and authentic assessment received comparatively lower ratings. The two sets of data were integrated when the quantitative findings were used to focus the interviews and when the survey results and interview themes were brought together during interpretation.

The study was conducted between June and July 2025 in the Family Welfare Education Study Program, Faculty of Engineering, Universitas Negeri Makassar, Indonesia. The study involved students who had completed the *Teaching and Learning Strategies* course and were therefore able to reflect on the pedagogical practices they had experienced. The course provided a relevant setting for the study because the students had direct experience of classroom discussions, collaborative work, practicum support, learning media, lecturer feedback, and assessment practices.

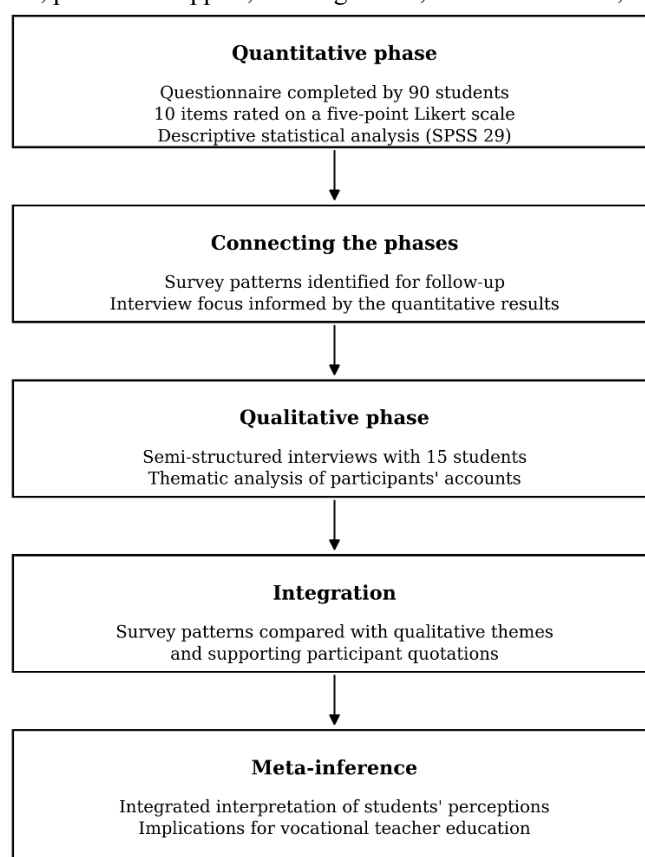


Figure 1. Explanatory sequential mixed-methods design and points of integration

Participants and Sampling

The accessible population comprised 90 fifth- and seventh-semester students enrolled in the Bachelor of Family Welfare Education Study Program who had completed the Teaching and Learning Strategies course. Completion of the course was used as the eligibility criterion because participants needed sufficient experience of the pedagogical practices examined in the inventory. All eligible students were invited to participate, and all 90 completed the questionnaire. Thus, the quantitative phase constituted a census of the accessible course cohort rather than a probability sample drawn from a wider student population. The findings consequently describe this particular cohort and are not intended to support statistical generalisation to other programmes or institutions.

For the qualitative phase, the pool of potential participants consisted of survey respondents who indicated their willingness to participate in a follow-up interview. Fifteen students were selected at random from this volunteer pool. The qualitative sample was intended to provide explanatory accounts of selected survey patterns rather than statistical representation of the full cohort. Accordingly, the interview findings were interpreted as context-specific explanations of participants' experiences and not as estimates of how frequently particular views occurred among all survey respondents.

Interview data were reviewed as data collection progressed to determine whether subsequent interviews continued to provide new information relevant to the explanatory focus. The review concentrated on students' accounts of active discussion, collaborative learning, feedback provision, and authentic assessment. In the later interviews, the accounts increasingly repeated explanatory content that had already been identified, and by the fifteenth interview no additional topic-specific pattern relevant to these areas was observed. Data collection was therefore concluded on the basis of topical redundancy. This judgement is limited to the selected interview topics and should not be interpreted as evidence that every possible meaning or student experience had been exhaustively captured.

Research Instruments and Data Collection

Quantitative data were collected using a researcher-developed 10-item course-experience inventory. Item selection was guided by the research questions, the learning outcomes of the Teaching and Learning Strategies course, and the integrated course-level conceptual framework presented in the Introduction. The items were organised into three conceptual domains: instructional enactment and learner participation (Q1–Q4, Q6, Q8, and Q9), formative regulation (Q7), and vocational alignment (Q5 and Q10). Each item represented one operational aspect of the course experience; therefore, these groupings were used to clarify conceptual relationships rather than to define psychometric subscales. Table 1 presents the operational rationale for each item. Responses were recorded on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree).

The inventory was intended for item-level descriptive use rather than as a unidimensional psychometric scale. No separate pilot study, cognitive interview, formal expert-panel review, or content-validity index was conducted before administration. Consequently, the conceptual mapping presented in Table 1 clarifies the rationale for item inclusion but cannot be treated as retrospective evidence of content validity. Cronbach's alpha for the ten items was 0.295, which does not support combining the items into a total score. Although the heterogeneous content of the items may have contributed to the low coefficient, this explanation does not establish adequate reliability. Moreover, because each operational aspect was represented by only one item, the reliability of the individual aspects could not be estimated from the available data. Accordingly, the findings are reported separately for each item using response distributions, medians, means, and standard deviations; no total score or overall item average is used. Future research should develop multiple items for each construct and evaluate their content validity, response processes, dimensionality, and reliability through expert review and pilot testing.

Table 1. Conceptual and operational mapping of the course-experience inventory

Item	Operational focus	Conceptual domain	Operational rationale
Q1	Variety of teaching methods	Instructional enactment and learner participation	Represents the range of teaching approaches experienced by students.
Q2	Ease of understanding the material	Instructional enactment and learner participation	Represents students' perceived clarity and accessibility of course material.
Q3	Opportunities for active discussion	Instructional enactment and learner participation	Represents opportunities for dialogue and active participation.
Q4	Lecturer support during practicum	Instructional enactment and learner participation	Represents guidance provided during applied learning activities.
Q5	Relevance to labour-market needs	Vocational alignment	Represents the connection between course content and occupational requirements.
Q6	Collaborative learning strategies	Instructional enactment and learner participation	Represents peer interaction, exchange of ideas, and shared learning activity.
Q7	Feedback provision	Formative regulation	Represents information that students can use to recognise weaknesses and improve subsequent work.
Q8	Student involvement in learning decisions	Instructional enactment and learner participation	Represents learner participation and agency in the learning process.
Q9	Use of media and technology	Instructional enactment and learner participation	Represents technological support for teaching and learning activities.
Q10	Authentic assessment	Vocational alignment	Represents the correspondence between assessment tasks and professional practice.

The qualitative phase was conducted after a preliminary review of the item-level response distributions. The interview guide focused on patterns selected for further explanation: active discussion and collaborative learning (Q3 and Q6), as well as feedback provision and authentic assessment (Q7 and Q10). These items were selected because of their conceptual relevance and their numerical positions within the observed response distributions. Given the narrow differences among item responses, the selection was not interpreted as evidence that one pedagogical practice was substantively better or worse than another. Students were asked to describe their experiences of the selected aspects in their own words, while follow-up questions were used to clarify and elaborate relevant responses. Method variety (Q1) and technology use (Q9) were not specifically probed; therefore, the qualitative findings are not used to explain those two items.

Fifteen face-to-face interviews were conducted in Indonesian, with each interview lasting approximately 30–45 minutes. With the participants' permission, the interviews were audio-recorded and transcribed verbatim. The transcripts were checked against the recordings and anonymized using the labels Informant 1 to Informant 15. Quotations selected for inclusion in the article were translated into English while preserving the meaning of the participants' original responses.

Data Analysis

The questionnaire responses were analyzed using SPSS version 29 at the item level. Frequencies and percentages were calculated for each response category, and the combined percentage of Agree and Strongly Agree responses was reported as an agreement proportion for descriptive purposes. The median, mean, standard deviation, minimum, and maximum were calculated separately for each item. Because Likert-type responses are ordinal and each item represents a distinct operational aspect of the learning experience, the means and standard deviations were treated only as descriptive summaries. They were not used to infer statistically or substantively meaningful differences among the items. The ten items were not combined into a total score or overall average because the instrument was neither designed nor validated as a unidimensional scale and produced a Cronbach's alpha of 0.295. No inferential statistical tests were conducted because the research question and quantitative design were descriptive, and no statistical generalization beyond the accessible course cohort was intended.

The interview data were analyzed thematically by the researcher who conducted the interviews. The analysis began by checking the transcripts against the audio recordings and reading each transcript repeatedly to develop familiarity with the data. Excerpts relevant to the research questions were assigned initial codes, which were then compared across transcripts and grouped into broader categories according to similarities and differences in meaning. Candidate themes were developed from related categories and reviewed against both the coded excerpts and the complete transcripts. Responses that qualified or differed from the dominant patterns were retained to preserve variation in the participants' accounts. The candidate themes were subsequently refined and named according to their explanatory relevance to the selected survey findings. This process generated three themes: the perceived value of collaborative learning, the need for more specific and continuous feedback, and a preference for authentic, practice-oriented assessment.

Coding was conducted by one researcher; therefore, no intercoder agreement coefficient can be reported, and formal member checking was not undertaken. To strengthen analytic traceability, coding decisions were documented in a code-to-theme matrix, candidate themes were repeatedly compared with the source excerpts and complete transcripts, and responses that qualified or diverged from the main pattern were retained. Checking the transcripts against the recordings supported descriptive accuracy, while the inclusion of illustrative quotations made the connection between the interpretations and the participants' accounts visible to readers. These procedures improve the transparency and internal coherence of the analysis but do not constitute independent verification of the coding. Consequently, the absence of a second analytical perspective and participant review of the final themes remains a limitation of the qualitative findings.

Integration and Trustworthiness

Integration was carried out at three points in the study. First, the qualitative phase was connected to the quantitative phase by selecting interview participants from among the survey respondents. The preliminary survey results were also used to develop the interview guide, particularly the patterns related to active discussion, collaborative learning, feedback provision, and authentic assessment. Second, after the two datasets had been analyzed separately, the item-level survey results were compared with the qualitative themes and supporting quotations. This comparison was organized in a joint display to identify whether the interview findings confirmed, explained, extended, or differed from the quantitative patterns. Third, meta-inferences were developed by interpreting both forms of evidence together rather than drawing conclusions from either dataset alone.

The comparison showed that the interview findings helped explain the larger proportions of agreement observed for active discussion and collaborative learning and qualified the response patterns concerning feedback and authentic assessment. These descriptions refer only to the relative numerical positions of the items within a narrow response range and do not indicate statistically or substantively meaningful differences among them. A survey item was treated as qualitatively elaborated only when the interview data contained directly relevant evidence. Accordingly, survey items such as variation in teaching methods and the use of technology remained quantitative findings without corresponding qualitative explanation. This distinction was maintained to prevent the absence of interview evidence from being interpreted as confirmation and to avoid overstating convergence between the two datasets.

The trustworthiness of the qualitative analysis was addressed through transcript-to-recording checks, repeated reading of the transcripts, documentation of coding decisions in a code-to-theme matrix, comparison of candidate themes with the coded excerpts and complete transcripts, retention of responses that differed from the dominant patterns, and the presentation of illustrative quotations. During integration, each meta-inference was traced to a specific survey item and the corresponding qualitative theme or quotation. When no directly relevant interview evidence was available, the quantitative finding was explicitly classified as not qualitatively elaborated rather than being treated as confirmed. These procedures strengthened the transparency and traceability of the interpretation but did not compensate fully for the absence of intercoder agreement and formal member checking. The integrated findings were therefore interpreted as context-specific accounts of students' reported perceptions and experiences rather than independently verified evaluations of instructional effectiveness.

Ethical Considerations

This study did not receive prospective review from an institutional ethics committee; consequently, no ethics approval or exemption number is available. The research was limited to a non-interventional questionnaire and interviews concerning students' ordinary teaching and learning experiences, and no sensitive personal identifiers were collected. Although these procedures presented minimal foreseeable risk, this assessment was made by the research team rather than independently verified by an ethics committee and should not be interpreted as a formal exemption. The absence of prospective institutional ethics review is therefore acknowledged as a procedural limitation of the study.

Before data collection, participants received an explanation of the study's purpose, the procedures involved, the intended use of their responses, and the voluntary nature of participation. Informed consent was obtained before the questionnaire or interview was administered. Participants could decline to answer any question or withdraw from the study without penalty. Because the participants were students, the consent explanation explicitly emphasized that the decision to participate or not participate, as well as the responses provided, would have no effect on their grades or academic standing. This safeguard was intended to reduce perceived academic pressure associated with their status as students.

Names and other direct identifiers were not retained in the analytical dataset. Interview transcripts were anonymized using the labels Informant 1 to Informant 15. Separate permission was obtained for audio recording, and the recordings and transcripts were accessible only to the research team. Survey findings were reported in aggregate form, while quotations were reviewed and presented without demographic or contextual details that could reveal individual identities. These measures supported voluntariness, privacy, and confidentiality, but they do not replace the independent oversight that prospective institutional ethics review would have provided.

RESULTS

The findings are presented in accordance with the explanatory sequential design. Item-level survey results are reported first, followed by qualitative themes used to elaborate selected quantitative patterns and, finally, an integrated comparison of the two strands. Because the ten questionnaire items represented distinct aspects of the learning experience and did not form a reliable unidimensional scale, no total score or overall mean is reported. The quantitative findings are therefore presented only as response distributions and descriptive statistics for individual items.

Quantitative Findings of Students' Perceptions

All 90 students in the accessible course cohort completed the five-point Likert-type questionnaire. Across all ten items, the responses were confined to Neutral, Agree, and Strongly Agree; no respondent selected Disagree or Strongly Disagree. This restricted response distribution may reflect genuinely favourable perceptions. However, acquiescence, social desirability, and possible reluctance to express criticism within an academic setting cannot be excluded. The available data do not allow these possible explanations to be distinguished from genuine satisfaction. Accordingly, the agreement proportions describe only the students' reported response patterns and should not be interpreted as evidence of the absence of dissatisfaction, the effectiveness of the teaching strategies, or improvements in learning outcomes. The complete item-level distribution is presented in Table 2.

Table 2. Distribution of Students' Perceptions of Teaching and Learning Strategies

Item	Aspect Measured	Neutral n (%)	Agree n (%)	Strongly Agree n (%)	Agreement (Agree + Strongly Agree) (%)
Q1	Variety of teaching methods	25 (27.8)	38 (42.2)	27 (30.0)	72.2
Q2	Ease of understanding the material	19 (21.1)	47 (52.2)	24 (26.7)	78.9
Q3	Opportunities for active discussion	16 (17.8)	44 (48.9)	30 (33.3)	82.2
Q4	Lecturer support during practicum	21 (23.3)	46 (51.1)	23 (25.6)	76.7
Q5	Relevance of course content to labour market needs	22 (24.4)	33 (36.7)	35 (38.9)	75.6
Q6	Collaborative strategies in the classroom	17 (18.9)	39 (43.3)	34 (37.8)	81.1
Q7	Feedback provision	24 (26.7)	47 (52.2)	19 (21.1)	73.3
Q8	Student involvement in learning decision-making	20 (22.2)	50 (55.6)	20 (22.2)	77.8
Q9	Use of media and technology	17 (18.9)	42 (46.7)	31 (34.4)	81.1
Q10	Implementation of authentic assessment	24 (26.7)	45 (50.0)	21 (23.3)	73.3

Note. $N = 90$ for each item. No respondent selected Strongly Disagree or Disagree; therefore, these zero-frequency response categories are not displayed. Agreement represents the combined percentage of Agree and Strongly Agree responses and is reported for descriptive purposes only.

The combined proportion of Agree and Strongly Agree responses ranged from 72.2% to 82.2%, representing a span of 10 percentage points across the ten items. Q3, concerning opportunities for active discussion, had the largest agreement proportion at 82.2%, followed by Q6 on collaborative strategies and Q9 on media and technology use, each at 81.1%. Q1 on the variety of teaching methods had the smallest agreement proportion at 72.2%, while Q7 on feedback provision and Q10 on authentic assessment each had an agreement proportion of 73.3%. Neutral responses ranged from 17.8% for Q3 to 27.8% for Q1.

These numerical positions are descriptive and should not be interpreted as a definitive ranking of the pedagogical aspects or as evidence of substantively meaningful differences. Each aspect was represented by only one item, and no inferential comparison among items was intended. The distributions were used as descriptive signals for identifying selected issues to explore during the qualitative phase. Median, mean, and standard deviation values for each item are presented in Table 3 as supplementary item-level summaries.

Table 3. Item-Level Descriptive Statistics for the Teaching and Learning Strategy Indicators

Item	N	Minimum	Maximum	Median	Mean	SD
Q1	90	3	5	4.00	4.02	0.764
Q2	90	3	5	4.00	4.06	0.693
Q3	90	3	5	4.00	4.16	0.702
Q4	90	3	5	4.00	4.02	0.703
Q5	90	3	5	4.00	4.14	0.787
Q6	90	3	5	4.00	4.19	0.733
Q7	90	3	5	4.00	3.94	0.693
Q8	90	3	5	4.00	4.00	0.670
Q9	90	3	5	4.00	4.16	0.718
Q10	90	3	5	4.00	3.97	0.710

Note. The statistics are reported separately for each item. Means and standard deviations are supplementary descriptive summaries of the ordinal responses and are not intended to establish statistically or substantively meaningful differences among the items. No composite score was calculated.

All ten items had a median of 4.00, corresponding to the Agree category. The item means ranged from 3.94 to 4.19, a difference of only 0.25, while the standard deviations ranged from 0.670 to 0.787. The identical medians and narrow range of means indicate broadly similar central response patterns across the items. Within this limited range, Q6 had the largest numerical mean ($M = 4.19$), followed by Q3 and Q9 ($M = 4.16$), whereas Q7 had the smallest numerical mean ($M = 3.94$), followed by Q10 ($M = 3.97$). These positions do not establish statistically significant or practically important differences. The patterns concerning active discussion, collaboration, feedback, and authentic assessment were examined further in the interviews to understand how students explained their responses.

Qualitative Findings from Student Interviews

The interviews were used to explain selected item-level patterns identified in the survey. The thematic analysis generated three themes: the perceived value of collaborative learning, the need for more specific and continuous feedback, and a preference for authentic, practice-oriented assessment. Each theme comprised a cluster of related codes, as summarised in Table 3. The themes were developed according to their explanatory relevance rather than the numerical frequency of particular expressions. The quotations presented in the following sections are representative illustrations of the corresponding code clusters and should not be treated as frequency evidence or as the sole basis for the themes. Accordingly, the qualitative findings explain how particular learning experiences may underlie the survey response patterns but do not estimate how widely each view was shared among the 15 interview participants.

Table 4. Qualitative Themes, Constituent Codes, and Interpretive Boundaries

Theme	Constituent codes	Interpretive boundary	Related survey item(s)
Perceived value of collaborative learning	Group discussion; exchange of ideas; mutual assistance; shared problem-solving; peer feedback	Describes perceived participation and peer support, not demonstrated improvement in academic achievement	Q3 and Q6
Need for more specific and continuous feedback	Brief lecturer comments; general guidance; unclear areas for improvement; limited follow-up	Concerns the specificity, continuity, and usefulness of feedback; it does not indicate that feedback was entirely absent	Q7
Preference for authentic, practice-oriented assessment	Product creation; performance tasks; practical relevance; connection with vocational competence	Expresses a preference for stronger practical alignment; it does not represent rejection of written assessment	Q10

Note. The constituent codes summarise the main analytical components recorded in the code-to-theme matrix. The quotations presented in the narrative are representative illustrations of these code clusters. The table does not report participant frequencies because the thematic analysis focused on explanatory meaning rather than prevalence.

Perceived Value of Collaborative Learning

The first theme captured collaboration as a participatory and peer-supported learning process. The associated codes included group discussion, exchange of ideas, mutual assistance, shared problem-solving, and peer feedback. Taken together, these codes framed collaborative learning not simply as working in groups but as an opportunity for students to articulate their understanding, compare perspectives, and obtain assistance from classmates. The following quotation was selected because it brings together several elements within this code cluster:

“When we worked in groups, we learned much more than by just listening to theory. We discussed, helped each other, and provided constructive feedback” (Informant 6).

This account helps explain the agreement patterns for Q3 on opportunities for active discussion and Q6 on collaborative strategies. In particular, it illustrates how group activities were perceived as creating opportunities for participation and peer support. The reference to constructive feedback in this account concerns feedback exchanged among students during group work and is therefore distinct from Q7, which concerns feedback provided by the lecturer. The quotation represents a reported learning experience and does not demonstrate that collaborative learning directly improved academic achievement or vocational competence.

Need for More Specific and Continuous Feedback

The second theme concerned the distinction between receiving feedback and receiving sufficiently specific and actionable guidance. The code cluster included brief lecturer comments, general feedback, uncertainty about areas requiring improvement, and limited follow-up after presentations or practical activities. Thus, the analytical issue was not the complete absence of feedback but whether the feedback enabled students to recognise weaknesses and determine their next steps. One participant expressed this distinction as follows:

“Sometimes after a presentation or practicum, we do not know what was lacking or what needs to be improved. The feedback is brief and general” (Informant 3).

At the item level, Q7 received 73.3% combined agreement and 26.7% Neutral responses, with a median of 4.00 and a mean of 3.94. The interview account qualifies this generally affirmative response pattern by showing that

acknowledgement of feedback could coexist with a perceived need for greater specificity, continuity, and practical usefulness. The finding should therefore be interpreted as a request for more actionable feedback rather than as evidence that lecturers did not provide feedback.

Preference for Authentic, Practice-Oriented Assessment

The third theme concerned the perceived alignment between assessment activities and vocational practice. The associated codes included product creation, performance tasks, practical relevance, and opportunities to demonstrate vocational competence. These codes reflected an expectation that assessment should make students' applied abilities more visible while continuing to accommodate other forms of assessment. The following quotation illustrates this expectation:

"If possible, the evaluation should not only be a written test. It would be better if we created a product, such as a fashion design or a work presentation. That feels more useful" (Informant 11).

Q10 received 73.3% combined agreement and 26.7% Neutral responses, with a median of 4.00 and a mean of 3.97. The interview account expands this response pattern by indicating that the concern related to the balance and practical orientation of assessment rather than rejection of the existing assessment practices. It suggests a preference for stronger alignment between assessment tasks, demonstrable performance, and the professional context of prospective vocational educators. However, the quotation does not establish that every interview participant held the same preference or that the existing assessment system lacked all practice-oriented components.

Integration of Quantitative and Qualitative Findings

Integration was conducted at the item level after the quantitative and qualitative datasets had been analysed separately. A survey item was connected to a qualitative theme only when the interview evidence directly addressed the same pedagogical aspect. The resulting relationships were classified as convergence and explanation, explanation and qualification, explanation and expansion, or quantitative findings that were not qualitatively elaborated. Items that were not selected for focused qualitative follow-up were retained as survey-only findings, and the absence of interview evidence was not interpreted as confirmation. Table 5 presents these relationships and the resulting meta-inferences.

Table 5. Joint display of quantitative and qualitative findings

Quantitative pattern	Qualitative evidence	Type of integration	Meta-inference
Q3: 82.2% agreement and 17.8% Neutral; Q6: 81.1% agreement and 18.9% Neutral	An interview account described group discussion as enabling students to exchange ideas, assist one another, and provide peer feedback (Informant 6).	Convergence and explanation	The agreement observed for discussion and collaboration was interpreted in relation to perceived opportunities for participation and peer support. It does not demonstrate improvement in learning performance.
Q7: 73.3% agreement and 26.7% Neutral	Lecturer feedback was described as present but sometimes too brief or general to identify areas requiring improvement (Informant 3).	Explanation and qualification	Agreement that feedback was provided coexisted with a perceived need for feedback that was more specific, continuous, and actionable.
Q10: 73.3% agreement and 26.7% Neutral	A preference was expressed for product-based and performance-based tasks with a clearer connection to vocational practice (Informant 11).	Explanation and expansion	Agreement with the existing assessment experience coexisted with an expectation for stronger alignment between assessment and practical vocational competence.
Q9: 81.1% agreement and 18.9% Neutral	Media and technology use did not form a distinct interview theme, and no retained quotation directly addressed this item.	Quantitative finding not qualitatively elaborated	The survey indicates reported agreement concerning media and technology use, but the interviews provide no basis for explaining the reasons for this pattern.

Quantitative pattern	Qualitative evidence	Type of integration	Meta-inference
Q1: 72.2% agreement and 27.8% Neutral	Variation in teaching methods did not form a distinct interview theme, and no retained quotation directly addressed this item.	Quantitative finding not qualitatively elaborated	The survey describes students' responses to the variety of teaching methods, but the reasons for the response distribution cannot be established from the interviews.
Q2: 78.9% agreement; Q4: 76.7%; Q5: 75.6%; Q8: 77.8%	These items were not selected for focused qualitative elaboration and were not represented by distinct interview themes.	Quantitative findings outside the qualitative follow-up focus	These results remain item-level survey descriptions. No qualitative mechanism or explanation is inferred for ease of understanding, practicum support, labour-market relevance, or involvement in learning decisions.

Note. Agreement represents the combined percentage of Agree and Strongly Agree responses. All items had a median of 4.00. The percentages and medians are descriptive and do not establish statistically or substantively meaningful differences among the items. A finding was classified as not qualitatively elaborated when no directly corresponding theme or retained interview evidence was available.

The joint display demonstrates that the two strands did not contribute identical forms of evidence. For Q3 and Q6, the interview account provided a possible explanation for the survey agreement by connecting discussion and collaboration with participation, mutual assistance, and peer support. This relationship represents convergence at the level of students' reported experiences, but it does not establish that collaborative learning improved achievement or competence.

For Q7 and Q10, the qualitative evidence qualified and expanded the survey patterns. Although most survey respondents selected Agree or Strongly Agree and both items had a median of 4.00, the interview accounts identified more specific expectations concerning actionable lecturer feedback and assessment tasks aligned with vocational practice. These findings are not contradictory. Instead, they show that general agreement with an aspect of the learning experience can coexist with suggestions for its improvement.

Other survey findings did not receive qualitative elaboration. Q1 and Q9 were not represented by distinct themes, while Q2, Q4, Q5, and Q8 were outside the focused qualitative follow-up. The reasons underlying these response patterns therefore cannot be inferred from the interview data. Taken together, the integrated findings indicate generally affirmative but differentiated student perceptions, accompanied by specific expectations concerning feedback and authentic assessment. Given the restricted response distribution, single-item measurement, and limited qualitative verification, these findings should not be interpreted as evidence of instructional effectiveness.

DISCUSSION

The principal mixed-methods finding of this study should not be understood as indicating that one teaching strategy was clearly more highly regarded than another. Responses to all ten questionnaire items were confined to Neutral, Agree, and Strongly Agree; all items had a median of 4.00, and their means occupied a narrow range from 3.94 to 4.19. These small numerical differences provide a descriptive ordering of the items but do not demonstrate substantively different evaluations. The integrated findings instead indicate a generally affirmative response pattern accompanied by more specific interview-based expectations concerning the usefulness of feedback and the vocational authenticity of assessment. The restricted response range may reflect genuinely favourable experiences, but acquiescence, social desirability, or reluctance to criticise course practices cannot be excluded.

Viewed through the conceptual framework of this study, the findings connect three pedagogical functions: enabling learner participation, supporting formative regulation, and aligning learning and assessment with vocational practice. Discussion and collaboration can provide opportunities for students to exchange ideas and seek assistance, while feedback can help them identify how their work should be improved. Authentic assessment, in turn, connects learning activities with the professional situations and competencies for which students are being prepared. The qualitative findings illustrate how these functions coexisted within students' experiences, but they do not establish causal relationships among them or demonstrate their effects on learning outcomes.

Responses to Q3 on active discussion and Q6 on collaborative learning were concentrated in the Agree and Strongly Agree categories, and both items had a median of 4.00. The interview material helped explain why these practices were viewed affirmatively: students valued opportunities to discuss course content, exchange ideas, and seek assistance from peers. These findings indicate that interaction with classmates was perceived as a useful feature of the course. They should not, however, be interpreted as evidence that collaborative learning was the most effective strategy

or that it improved conceptual understanding, teamwork skills, or academic achievement, because these outcomes were not measured.

This interpretation is consistent with [Noguera et al. \(2024\)](#), who showed that vocational education students' satisfaction varied according to the teaching strategies and delivery modes they experienced. Their study supports the value of examining how individual pedagogical practices are received by students rather than treating a course as a single undifferentiated learning experience. Evidence from pre-service teacher education also indicates that the quality of collaborative learning depends on conditions such as students' collaborative skills, participation, responsibility, and the way group activities are structured and assessed ([Le et al., 2018](#)). The present study did not examine these conditions. Consequently, the affirmative perceptions of collaboration should not be taken as evidence that participation was equally distributed or that the activities were optimally designed. Future course evaluations could examine students' roles, individual accountability, peer support, and patterns of participation within collaborative tasks.

The responses to Q9 indicate a generally affirmative perception of media and technology use: 81.1% of respondents selected Agree or Strongly Agree, and the item had a median of 4.00. Nevertheless, this result does not show that technology use was evaluated substantively more positively than the other strategies, given the narrow variation across all questionnaire items. In addition, Q9 measured technology use through a single general statement and did not identify the technologies used, their frequency, their instructional purposes, or the ways students interacted with them. Technology use did not emerge as a distinct interview theme; therefore, the qualitative findings cannot explain the reasons underlying the survey responses.

[Tsaury et al. \(2024\)](#) showed that virtual reality simulations could complement practical instruction in heavy-equipment engineering, while also recognising that simulated activities could not replace competencies requiring direct practice. This finding illustrates the broader principle that technology in vocational education should serve an identifiable pedagogical purpose and remain connected to practical competence. It does not indicate that the same technology was used or produced comparable benefits in the course examined here. Subsequent research should therefore document the types and purposes of educational technology and examine their relationship with student participation, practical learning, and demonstrated performance before conclusions about their educational contribution are drawn.

For Q7, 73.3% of respondents selected Agree or Strongly Agree, 26.7% selected Neutral, and the median was 4.00. Thus, the result does not indicate a generally negative evaluation of lecturer feedback. Nor should its position in the numerical ordering be interpreted as a substantively lower evaluation, because the differences among item means were small. Its importance becomes clearer through mixed-methods integration: an interview account indicated that feedback following presentations or practical activities could be too brief or general to identify what should be improved. The combined evidence therefore identifies an expectation for more actionable feedback, rather than demonstrating that feedback was absent or ineffective throughout the course.

This interpretation is consistent with [Dawson et al. \(2019\)](#), who found that students associated effective feedback with information that was sufficiently detailed, personalised, and usable for improving subsequent work. Feedback in vocational teacher education should therefore do more than communicate whether a task has been completed satisfactorily; it should help students recognise the quality of their performance and determine their next steps. Linking comments to assessment criteria, providing examples of required improvements, and allowing students to apply feedback in a subsequent task are possible course-development strategies. These strategies were not compared in the present study and should therefore be treated as recommendations for evaluation rather than as demonstrated solutions. Future research should measure the specificity, timing, frequency, and usability of feedback through multiple indicators instead of representing feedback provision with a single item.

For Q10, 73.3% of respondents selected Agree or Strongly Agree, 26.7% selected Neutral, and the median was 4.00. Accordingly, the survey does not demonstrate dissatisfaction with the existing assessment practices. The interview evidence nevertheless adds an important qualification: students expected more opportunities to demonstrate learning through products, practical performances, and tasks that they regarded as relevant to vocational practice. The integrated finding is therefore not that assessment was necessarily inauthentic, but that some students perceived scope for a closer connection between assessment tasks and the professional situations for which they were being prepared. Because Q10 consisted of a single item, the survey could not distinguish whether these responses concerned task realism, cognitive demand, assessment format, performance criteria, or another feature of assessment.

[Villaruel et al. \(2024\)](#) similarly identified differences between teachers' and students' perceptions of assessment quality and the characteristics of written examinations in vocational education. [Welsandt et al. \(2024\)](#) further emphasised that authentic assessment requires alignment with the curriculum and the competencies of the relevant professional domain. These studies indicate that authenticity is not achieved simply by replacing a written examination

with a product or practical task. It also depends on whether the task represents realistic professional demands, requires appropriate cognitive processes, and evaluates relevant competencies. In vocational teacher education, possible assessment formats could include designing lessons for realistic vocational classrooms, conducting microteaching, responding to classroom-based cases, and compiling teaching portfolios. These examples are recommendations derived from the interpretation of the findings; their effectiveness was not tested in this study and should be evaluated using evidence of student performance and teaching practice.

For Q5, 75.6% of respondents selected Agree or Strongly Agree, while the remaining respondents selected Neutral, and the item had a median of 4.00. These responses indicate that students generally perceived the course content as relevant to labour-market needs. They do not, however, objectively demonstrate alignment with current occupational requirements because the study did not analyse competency standards, curriculum documents, workplace practices, or employer perspectives. Moreover, labour-market relevance did not emerge as a distinct interview theme, so the reasons underlying the survey responses remain unclear. In related vocational contexts, [Yoto et al. \(2024\)](#) highlighted connections between programme activities and community or industry demands, while [Arinaitwe \(2021\)](#) identified joint planning and sustained collaboration between vocational teacher education institutions and workplaces as important conditions for workplace-connected learning. The present findings consequently support the need for external curriculum review rather than confirming that such alignment has already been achieved. Course outcomes and assessment tasks could be mapped against vocational teaching competencies and reviewed with schools, training institutions, graduates, and relevant workplace partners.

The conceptual contribution of this study lies not in establishing a hierarchy among the ten questionnaire items, but in showing how students' perceptions can be interpreted across three connected pedagogical functions: enabling participation, regulating improvement through feedback, and aligning learning and assessment with vocational practice. The integrated evidence indicates that generally affirmative survey responses can coexist with more specific expectations expressed in interviews. Students may appreciate opportunities for discussion and collaboration while also expecting feedback that communicates clearer next steps and assessment tasks that more closely represent professional practice. These relationships are interpretive and were not tested as a measurement model or causal structure; consequently, the study refines the contextual understanding of students' pedagogical experiences rather than validating a new theory.

The methodological contribution arises from the differentiation among convergence, explanation, expansion, and findings that were not qualitatively elaborated. The interviews helped explain the perceived value of collaborative activities and expanded the interpretation of feedback and authentic assessment, but they did not explain every affirmative questionnaire response, particularly those concerning technology and labour-market relevance. This distinction prevents the qualitative evidence from being presented as if it confirmed all quantitative findings. For course development, the findings suggest examining the structure of collaborative activities, providing feedback that communicates specific improvement actions, and designing assessment tasks that represent the work of prospective vocational teachers. These implications should be treated as priorities for further evaluation, not as interventions whose effectiveness has been demonstrated by the present study.

Several limitations define the boundaries of these interpretations. The study involved one cohort in one university and used a researcher-developed questionnaire containing one item for each pedagogical dimension. The absence of a pilot study and formal content-validity assessment, together with the low Cronbach's alpha of 0.295, means that the instrument cannot support interpretation of a composite perception construct. The restricted response distribution also means that acquiescence, social desirability, and reluctance to express criticism cannot be separated from genuinely favourable perceptions. In addition, the study measured self-reported perceptions rather than student performance, observed teaching practice, or instructional effectiveness. The interviews involved a limited subsample, were coded by one researcher, and were not supported by intercoder agreement or formal member checking; thematic adequacy was based on recurring topical patterns rather than a formally documented saturation procedure. The absence of prospective institutional ethics review constitutes an additional procedural limitation, although participation was voluntary and informed-consent and confidentiality procedures were applied. Future studies should use validated multi-item measures, prospective ethical review, more than one qualitative analyst, participant verification where feasible, and evidence from observations, performance assessments, documents, and multiple stakeholder groups across institutions.

CONCLUSION

This explanatory sequential mixed-methods study identified a generally affirmative but differentiated pattern in students' perceptions of pedagogical strategies within one vocational teacher education course. Responses to all ten questionnaire items were confined to Neutral, Agree, and Strongly Agree, and every item had a median of 4.00.

Because the numerical differences among items were narrow, they should not be interpreted as evidence that one strategy was substantively more effective than another. Integration of the two strands indicated that collaborative activities were valued for supporting discussion, idea exchange, and peer assistance, while the interview accounts also expressed expectations for more specific and actionable feedback and assessment tasks more closely connected with vocational practice.

The findings suggest that students' pedagogical experiences are more appropriately understood through the connected functions of learner participation, formative guidance, and vocational alignment than through a single overall score. Course review may therefore preserve opportunities for discussion and collaboration while examining whether feedback clearly identifies subsequent improvement actions and whether assessment tasks represent the professional work of prospective vocational teachers. Microteaching, classroom-based cases, lesson-design tasks, and teaching portfolios may be considered, but their contribution should be evaluated rather than assumed.

These conclusions are context-specific and subject to important methodological limitations. The study involved one cohort at one institution and used a researcher-developed inventory with one item for each dimension, no pilot study or formal content-validity assessment, and low internal consistency. The restricted response distribution may also reflect acquiescence, social desirability, or reluctance to criticise course practices. In addition, the study relied on self-reported perceptions rather than learning outcomes or observed teaching performance. The interviews were analysed by one researcher without intercoder agreement or formal member checking, and no prospective institutional ethics review was obtained. Future studies should use validated multi-item measures, obtain prospective ethical approval, incorporate independent qualitative analysis and participant verification where feasible, and combine perceptions with observations, performance evidence, and input from multiple stakeholders and institutions.

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