






## Article

# Student Professional Collaboration as a Contemporary Format for Knowledge Sharing and Conducting Research in the University Environment

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## Abstract

This study aimed to describe the profile of professional collaboration among students in teacher-education programmes and to examine whether readiness for further collaboration is associated with prior experience. The work was conducted within a university grant of Abai Kazakh National Pedagogical University and implemented as a descriptive-comparative study based on a posttest cross-sectional snapshot with no baseline measurement. Data were collected via Google Forms from 91 students of the Department of Primary Education (Years 1–4). The questionnaire covered collaboration experience (yes/no), frequency of participation in joint projects, perceived value of collaboration (1–5), perceived impact on the learning experience, readiness to participate in joint research/projects in the future (1–5), and open-ended questions on motivations, barriers, and expected university support. Prior collaboration experience was reported by 40.7% of respondents; participation was predominantly irregular (48.4% “never”, 44.0% “rarely”). Perceived value was high ( $M = 4.05$ ,  $SD = 1.15$ ;  $Me = 4$ ), and most respondents reported a positive contribution to their learning experience (75.8%). Readiness for future participation was moderately high (levels 4–5: 52.7%). A Mann–Whitney test indicated higher readiness among students with prior collaboration experience ( $U = 1288$ ,  $p = 0.016$ ,  $r = 0.29$ ). Thematic grouping of open-ended responses showed that knowledge sharing and mutual support were the dominant motivations, while organisational/time and communication barriers were most frequently mentioned; the most commonly requested support measures included regular joint events and support for student communities. Findings are interpreted as a descriptive snapshot rather than causal evidence. The results may inform the design of facilitated collaboration formats and subsequent monitoring of student readiness.



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## 1. Introduction

Professional collaboration among university students is increasingly viewed not as an “additional activity” but as a practical context for academic socialisation: through joint projects, research tasks, and intergroup interaction, students can practise communication, role distribution, collective decision-making, and responsibility for shared outcomes. This

is particularly salient in teacher education, where future teachers routinely work in teams in real professional settings—with colleagues, administrators, parents, and external partners. Therefore, students' readiness to collaborate, as well as their actual experience of engagement in joint practices, becomes an indicator relevant both to university educational policy and to the quality of graduate preparation. At the same time, university practice often reveals a gap between the declared value of collaboration and its everyday "density": students may endorse collaboration as an idea yet rarely participate in joint projects or lack a stable experience of intergroup or interuniversity interaction. In such situations, managerial decisions in higher education cannot rely on general statements about the importance of collaboration; rather, it is necessary to document empirically how, within a specific student sample, (a) the presence of prior experience, (b) the frequency of actual participation, (c) the perceived value of joint work, (d) perceptions of its impact on the learning experience, and (e) readiness to engage in future initiatives are related.

This study was conducted in the context of a university grant of Abai Kazakh National Pedagogical University aimed at developing student professional collaboration as a format for knowledge sharing and joint research practices. Within the project initiative, the student club "Bilim vektory" was developed among students enrolled in the Primary Education/ICT and Primary Education/Business Innovation programmes; however, in the present paper, the empirical basis is defined primarily by online survey data, which capture a "snapshot" of students' experiences and attitudes at the time of the questionnaire administration.

The aim of the study was to describe the profile of student professional collaboration (experience, regularity of involvement, perceived value, perceived impact on the learning experience, and readiness for future participation) and to compare readiness between students with and without prior collaboration experience using a posttest cross-sectional snapshot. The empirical basis of the study is an online survey of 91 students of the Department of Primary Education enrolled in the programmes Primary Education/ICT, Primary Education/Business Innovation, Primary Education/Multilingual, and Primary Education/English. In line with this aim, the study pursued the following objectives: (1) to determine the proportion of students with and without intergroup or interuniversity collaboration experience; (2) to describe participation frequency in joint projects; (3) to assess the perceived importance of collaboration and the degree of agreement with its impact on the learning experience; (4) to examine the distribution of readiness to participate in joint research/projects in the future; (5) to compare readiness for future participation between students with and without prior collaboration experience; and (6) to summarise motivations, barriers, and student suggestions through thematic grouping of open-ended responses. Despite extensive research on collaborative learning, a persistent challenge in teacher education is the attitude–participation gap: students often report valuing collaboration while engaging in it irregularly. The study contributes by empirically mapping the attitude–participation gap in student professional collaboration in an underrepresented teacher-education context and by identifying actionable organisational leverage points that help contextualise why positive attitudes do not translate into regular engagement. This diagnostic baseline is intended to inform the design of structured collaboration formats to be tested in future longitudinal or intervention-based research.

The study addresses two related research questions:

RQ1—What is the current profile of experience, participation frequency, and attitudes toward professional collaboration among teacher-education students in this sample?

RQ2—Is readiness to participate in future joint projects (including small-scale research/inquiry tasks) associated with prior collaboration experience?

Given the design logic and the planned comparison, a working hypothesis was formulated: students with prior collaboration experience are expected to report higher readiness to participate in future collaborative initiatives than students without such experience.

The scientific and practical contribution of the article lies in providing an empirically grounded description of the “current state” of student professional collaboration in a university context and in identifying the barriers and management measures most frequently articulated by the participants themselves. This creates a basis for practice-oriented decisions (event formats, support for student-club initiatives, organisational conditions) that can be built on observable indicators and student needs rather than on declarative claims.

## 2. Literature Review

### 2.1. *Professional Collaboration of Students in Teacher Education as a Learning and Professionalisation Mechanism*

In teacher education, student collaboration is not only a mode of completing group tasks but also a context in which future teachers practise communication, shared responsibility, role distribution, and professional judgement. Cooperative learning research shows that collaboration is most productive when interaction is structured through interdependence, accountability, and clear expectations rather than left to spontaneous group work (Johnson & Johnson, 2009). Meta-analytic evidence also indicates that small-group learning can support achievement and skill development when collaborative activity is purposefully organised (Springer et al., 1999; Slavin et al., 2003). For the present study, this literature is relevant because it explains why students’ prior collaboration experience, participation frequency, and perceived value of collaboration should be examined together. Recent work on group projects in higher education further shows that collaboration often remains irregular when students face unclear roles, unequal participation, and weak organisational support (Donelan & Kear, 2023).

### 2.2. *Cooperative Learning Foundations: Interdependence, Accountability, and Role Distribution*

A central problem in student collaboration is the difference between formal group work and genuinely collaborative learning. Social interdependence theory emphasises positive interdependence, individual accountability, promotive interaction, and group processing as conditions for effective collaboration (Johnson & Johnson, 2009). When these conditions are absent, teamwork may become a simple division of tasks, which can reduce co-construction and increase dissatisfaction (Salomon & Globerson, 1989). Guidance is therefore important: collaborative learning depends on how instructors structure tasks, monitor interaction, and support regulation (van Leeuwen & Janssen, 2019). This perspective directly informs the present study’s attention to students’ perceived barriers, including coordination difficulties, unclear roles, uneven contribution, and time constraints.

### 2.3. *Peer Feedback and Facilitation as Support Mechanisms*

Peer feedback and peer assessment are relevant to student collaboration because they make criteria, judgement and revision explicit. Prior studies show that peer assessment can support learning when it is organised through clear criteria, feedback scaffolds, and opportunities for revision (Topping, 1998, 2010; Double et al., 2020; Li et al., 2020; Alqassab et al., 2023). Feedback is more useful when it is dialogic and psychologically safe rather than punitive (Gielen et al., 2010). Facilitation also matters because it helps maintain task focus without replacing student agency (Hmelo-Silver & Barrows, 2006). In this study, these ideas justify analysing students’ requests for university support, regular events, clubs, platforms, and structured formats as practical conditions that may help transform positive attitudes into actual participation.

#### *2.4. Online and Hybrid Group Work in Higher Education: Coordination, Participation, and Support*

Reviews of online group work in higher education show that recurrent problems cluster around participation inequality, insufficient preparation, and unstable group relationships, whereas stronger outcomes are associated with careful task design, fair assessment arrangements, and continuing support (Donelan & Kear, 2023). Similarly, research on online peer feedback suggests that digital formats can expand interaction, but their educational value depends on design quality and students' readiness to engage in critique and revision (Gao et al., 2024).

#### *2.5. Psychosocial Conditions: Dialogue Quality, Psychological Safety, and Participation Equity*

Collaboration depends not only on task organisation but also on the psychosocial climate in which students interact. Research on classroom dialogue emphasises that meaningful participation requires norms of respect, openness, and shared reasoning (Mercer et al., 1999), while sociocultural perspectives highlight the role of interactional support in enabling participation and learning through joint activity (Vygotsky, 1978). Recent higher education research similarly identifies psychological safety as an important condition for teamwork, especially where students anticipate judgment or unequal evaluation (Robinson & Held, 2024). Studies of group work experiences also show that dissatisfaction is often linked to fairness concerns, uneven contribution, and unclear shared standards (McKay & Sridharan, 2023). In the present study, this literature provides a bounded lens for interpreting reported barriers and support needs without implying causal conclusions.

#### *2.6. Collaboration as Research-Based Learning in Teacher Education*

In teacher education, collaboration is increasingly enacted not only through group assignments but also through research-oriented formats in which students jointly investigate practice, interpret evidence, and justify pedagogical decisions. Research-based learning has been described as a challenging but potentially formative element of teacher preparation, because it requires students to coordinate inquiry tasks, negotiate interpretations, and translate findings into actionable teaching decisions (Brew & Saunders, 2020). In research-based teacher education designs, collaboration becomes a practical bridge between research and professional judgement, but its benefits depend on the clarity of roles, decision rules, and guidance mechanisms rather than on participation alone (Afdal & Spernes, 2018). Empirical work on student teachers' collaborative research similarly shows that productive inquiry groups need support to balance elaboration and decision-making; otherwise, research activity may become fragmented and burdensome (Dobber et al., 2012). This literature justifies treating students' readiness to engage in joint research/projects as a bounded indicator of collaboration-oriented intention in the present survey, while avoiding any causal claims about skill development.

#### *2.7. Research Gap and Link to the Present Study*

Although evidence consistently indicates that cooperative learning and peer feedback can enhance learning under well-designed conditions, contemporary reviews converge on a critical limitation: collaboration quality is highly sensitive to contextual factors such as task design, guidance, fairness norms, and psychosocial climate (Donelan & Kear, 2023; van Leeuwen & Jansen, 2019). At the same time, much of the literature is dominated by intervention studies or platform-specific implementations, whereas fewer studies offer a structured empirical snapshot of students' collaboration experience, perceived value, readiness, and barriers within a specific teacher education context—particularly in under-represented institutional and regional settings. Against this background, the present study addresses a pragmatic gap by mapping (a) students' prior collaboration experience and par-

ticipation frequency, (b) perceived value and perceived impact on the learning experience, (c) readiness for future collaboration, and (d) barriers and support needs articulated by students. The design is intentionally posttest and descriptive–comparative; accordingly, the analytical emphasis is not causal attribution but identification of the current collaboration profile and the most actionable institutional leverage points. This rationale leads directly to the Section 3, where the survey structure (Google Forms), variable coding, and the planned comparison (readiness by the presence/absence of prior collaboration experience) are specified.

### 3. Materials and Methods

#### 3.1. Project Context

The study was conducted within a university grant of Abai Kazakh National Pedagogical University aimed at developing student professional collaboration as a format for knowledge sharing and joint academic practices. Within the grant, the student club “Knowledge Vector (Bilim vektory)” was supported as an organisational initiative bringing together Years 1–4 students enrolled in the Primary Education/ICT and Primary Education/Business Innovation programmes. Nevertheless, the present paper relies primarily on survey evidence: the analysis and conclusions are based on a one-time online questionnaire administration that captures the current profile of experience, attitudes, and readiness for collaboration in the sample at the time of the study. This work is not an evaluation of club effectiveness and does not employ an intervention design; the club is treated as an element of the institutional context in which the survey was administered.

#### 3.2. Study Design

The study followed a descriptive–comparative logic using a posttest cross-sectional snapshot (a single survey administration with no baseline measurement). Given the absence of baseline diagnostics and randomisation, the findings are interpreted as indicators of the current state and as between-group differences observed at the time of the survey (e.g., by the presence/absence of prior collaboration experience), rather than as causal estimates of the effects of specific initiatives or events. This design enables the identification of perceived conditions, barriers, and priority areas for student professional interaction and supports the formulation of practice-oriented recommendations for the university environment.

#### 3.3. Participants

The online survey involved 91 students of the Department of Primary Education enrolled in the following programmes: Primary Education/ICT, Primary Education/Business Innovation, Primary Education/Multilingual, and Primary Education/English. Recruitment was conducted through academic advisers (curators), student groups, and internal mailing lists. Participation was voluntary; prior to completing the questionnaire, respondents provided informed consent, and confidentiality of responses was ensured. Because recruitment relied on voluntary response, self-selection, and response bias cannot be ruled out. In addition, the sample is skewed toward Year 3 students ( $n = 47$ ), which limits cohort-level generalisation. Data were collected in April–May 2025 via an online Google Forms survey; the analysis included responses from students who completed the mandatory closed-ended items of the questionnaire. The distribution of participants by year of study is presented in Table 1.

**Table 1.** Distribution of participants by year of study ( $N = 91$ ).

Year of Study	<i>n</i>	%
Year 1	9	9.9
Year 2	26	28.6
Year 3	47	51.6
Year 4	9	9.9

### 3.4. Research Instrument and Operationalisation of Variables

Data were collected using Google Forms. The questionnaire was developed in line with the project objectives and included blocks reflecting key components of student professional collaboration in the university environment: (1) factual participation experience, (2) frequency of involvement in joint projects/activities, (3) perceived value of collaboration, (4) attitudes toward the impact of collaboration on the learning experience, (5) readiness to participate in joint research/projects in the future, and (6) perceived barriers and supportive conditions (open-ended responses).

To ensure analytical reproducibility, variables and coding rules were specified in advance. The general operationalisation scheme is presented in Table 2.

**Table 2.** Operationalisation and coding of key questionnaire variables.

Block/Variable	Data Type	Scale/Response Options	Coding and Reported Indicator
Prior collaboration experience (intergroup/interfaculty activities)	dichotomous	yes/no	Yes = 1, No = 0; sample proportions; subgroup comparison (experience: yes/no)
Frequency of participation in joint projects	ordinal	4 categories (from “never” to “often”)	ranking 1–4; frequencies/proportions; subgroup comparisons if needed
Perceived value of collaboration	ordinal (Likert-type)	1–5	M, SD, median; interpreted as an indicator of perceived value
Perceived impact of collaboration on the learning experience	ordinal	agreement categories	frequencies/proportions; aggregation if needed (agree vs. disagree)
Readiness to participate in the future	ordinal	5 readiness levels	ranking 1–5; subgroup comparison by prior experience
Barriers, motivations, suggestions (open-ended responses)	qualitative	text	thematic grouping; frequency of theme mentions; illustrative excerpts
<b>A. Conceptual mapping between theoretical blocks and operational indicators (bounded, non-causal)</b>			
Theoretical lens (bounded)	What it explains in this study		Operational indicator(s)
Social interdependence theory (structure/accountability)	Why unstructured group work fails (coordination, uneven contribution)		Barriers/themes (Q10), requested supports (Q14)
Attitude–participation gap (diagnostic framing)	Why high value can coexist with low participation		Value (1–5), participation frequency, open-ended barriers
TPB (non-causal interpretation)	Attitudes/control beliefs linked to intention		Value + perceived impact (attitudes), barriers (control), readiness (intention)
Research-based learning (teacher education)	Why “joint research/projects” is a legitimate collaboration format		Readiness for joint research/projects; prior formats including group research

Note. The mapping is interpretive and is used to justify indicator selection; it does not imply causal mechanisms within the posttest cross-sectional design.

Because key outcomes were measured primarily using single indicators (rather than multi-item psychometric scales), internal-consistency reliability indices (e.g., Cronbach's  $\alpha$ ) were not computed and are not required for interpreting each indicator as a distinct aspect of attitudes/readiness. Limitations inherent to self-report measurement (including variability in the wording of free-text responses) were considered during analysis and interpretation. Accordingly, these indicators are interpreted as pragmatic global markers of attitudes and readiness rather than as full multidimensional psychometric constructs; this choice prioritised brevity and respondent burden in a department-based diagnostic survey.

Questionnaire items and indicator wording were preliminarily checked for content validity through an expert review procedure. Two experts (teacher-education faculty members) with experience in organising group work and in survey-based educational research participated in the review. Each item was evaluated against three criteria: alignment with the intended construct, clarity of wording, and appropriateness for the target group; feedback was provided in written form. Based on the review, ambiguous items were reworded, duplicates were removed, and scales/response options were aligned to ensure consistency across blocks. A separate pilot test was not conducted; prior to distribution, the final version was additionally checked for logical transitions between blocks and for the correct functioning of the online format.

### 3.5. Data Processing and Analysis Procedures

Prior to analysis, the dataset was prepared for processing. Free-text response formats were consolidated into unified categories; invalid or empty values (e.g., technical symbols/placeholders) were treated as missing and excluded from calculations for the respective item (listwise/pairwise by variable).

Quantitative results are reported as frequencies and proportions for categorical variables and as means (M) and standard deviations (SD) for 1–5 scale items (medians were additionally recorded for ordinal scales). To compare readiness for future collaboration between students with and without prior collaboration experience, a nonparametric Mann–Whitney U test was applied, which is consistent with the ordinal nature of the measure. Statistical significance was set at  $p < 0.05$ . Where applicable, practical significance was assessed using an effect size for nonparametric comparisons (e.g., rank-biserial  $r$ ). These analyses are descriptive-comparative and do not imply causal effects.

Open-ended responses (Q9, Q10, and Q14) were analysed using qualitative content analysis with a thematic grouping procedure. The unit of analysis was a meaningful statement (a phrase/sentence expressing one complete idea). The analysis involved (1) familiarisation with the full set of responses; (2) open coding of recurring meanings; (3) aggregation of codes into thematic categories; and (4) refinement of category definitions to ensure internal homogeneity and external distinctiveness. Throughout the process, a codebook was maintained, including category labels, inclusion/exclusion rules, and typical examples. A single response could be assigned to multiple categories; therefore, category frequencies reflect the number of mentions rather than the number of respondents, and totals may exceed the valid N for a given question.

Coding was performed by two coders using a shared codebook. At the initial stage, they independently coded a subset of responses to calibrate category boundaries; discrepancies were then discussed and resolved through consensus, after which category labels and assignment rules were refined. The qualitative component followed the logic of thematic analysis, with coding, grouping of recurring meanings, and refinement of categories (Braun & Clarke, 2006). To ensure procedural transparency, an audit trail of analytical decisions was maintained, and verbatim excerpts were used as illustrative evidence when reporting results.

### 3.6. Ethics

All stages of the study were conducted in accordance with institutional ethical standards and the principles of voluntary informed consent. Participants were informed in advance about the study objectives and procedures and were free to decline participation at any time without consequences. The survey was administered anonymously and did not collect personal data. Access to the dataset was restricted to the research team, and the data were used exclusively for scientific purposes.

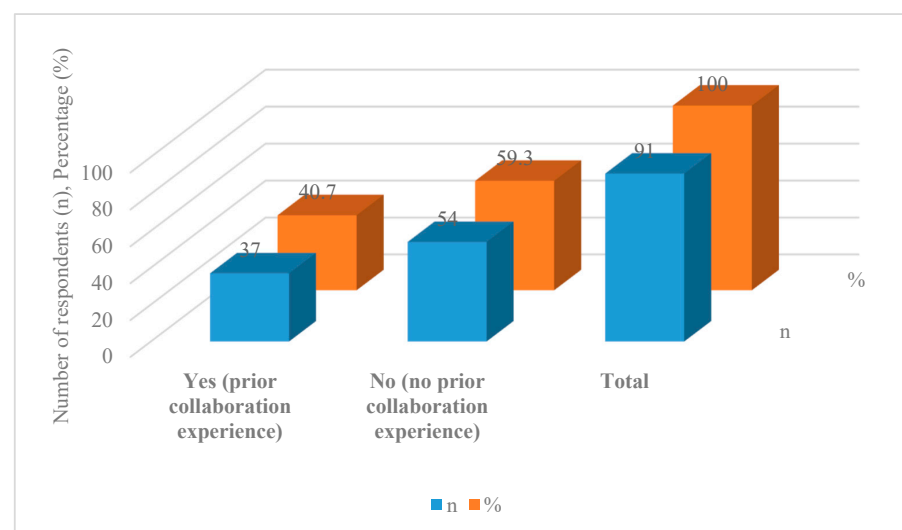
## 4. Results

### 4.1. Sample Description and Data Completeness

The analysis includes responses from 91 students of the Department of Primary Education ( $N = 91$ ). The distribution by year of study is presented in Table 1: Year 1—9 (9.9%), Year 2—26 (28.6%), Year 3—47 (51.6%), and Year 4—9 (9.9%). Data completeness for closed-ended items was high: valid responses were obtained from all 91 respondents for the key variables (year of study, programme, prior collaboration experience, participation frequency, perceived value of collaboration, agreement with the impact of collaboration on the learning experience, and readiness to participate in the future). Missingness occurred mainly in open-ended and partially text-based items: Q9 (what students like/why)—5 missing responses (valid  $n = 86$ ); Q10 (difficulties)—4 ( $n = 87$ ); Q14 (suggestions to the university)—6 ( $n = 85$ ); and Q15 (additional comment)—6 ( $n = 85$ ). In addition, isolated missing responses were recorded for Q11 (self-reported improvements)—3 ( $n = 88$ ) and for Q13 (perceived effectiveness compared with individual/group learning)—7 ( $n = 84$ ).

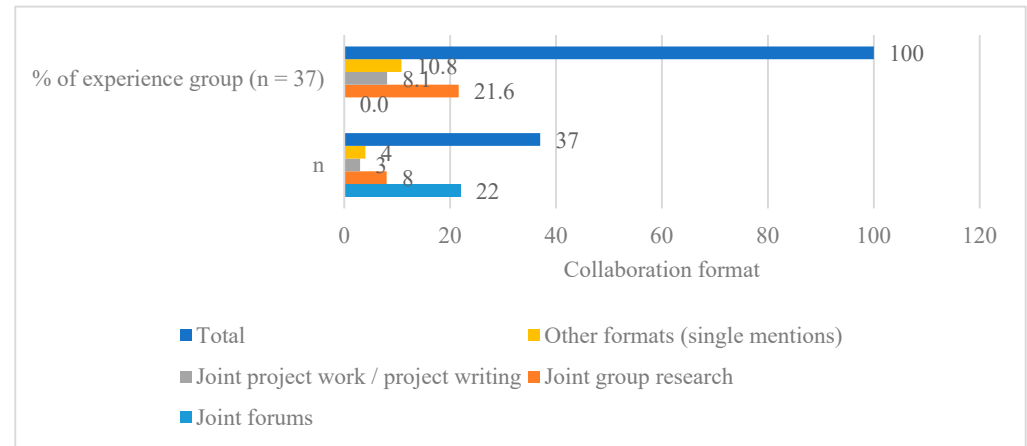
### 4.2. Students' Prior Collaboration Experience

According to the survey ( $N = 91$ ), prior participation in intergroup/interfaculty or interuniversity activities was reported by 37 students (40.7%), whereas 54 students (59.3%) indicated no such experience. Thus, the sample is dominated by respondents without confirmed collaboration experience, which provides an important context for subsequent results on participation frequency, value orientations, and readiness for future interaction. The formats of prior participation were captured via a separate questionnaire item (Q3), in which respondents selected the most appropriate option from a predefined list; responses entered under the "other" option were consolidated into broader categories during data processing (see Figure 1).



**Figure 1.** Prior collaboration experience (Yes/No),  $N = 91$ .

Among students who reported prior collaboration experience ( $n = 37$ ), the most frequently mentioned formats were joint forums ( $n = 22$ ) and joint group research ( $n = 8$ ), while joint project work/project writing was reported less often ( $n = 3$ ). Other formats were mentioned only once each ( $n = 1$ ), indicating a fragmented and heterogeneous pattern of collaboration practices within respondents' prior experience (see Figure 2).



**Figure 2.** Collaboration formats reported by students with prior collaboration experience ( $n = 37$ ).

#### 4.3. Frequency of Participation in Joint Projects

To assess the regularity of involvement in joint projects as part of educational/research activity, an item with four frequency categories was analysed ( $N = 91$ ). The distribution of responses is presented in Table 3: 44 students (48.4%) reported that they had never participated in such projects; 40 (44.0%) participated rarely (1–2 times per year); 5 (5.5%) sometimes (3–5 times per year); and 2 (2.2%) often (more than 5 times per year). Overall, the “never” and “rarely” categories predominated, together accounting for 92.4% of responses.

**Table 3.** Frequency of participation in joint projects ( $N = 91$ ).

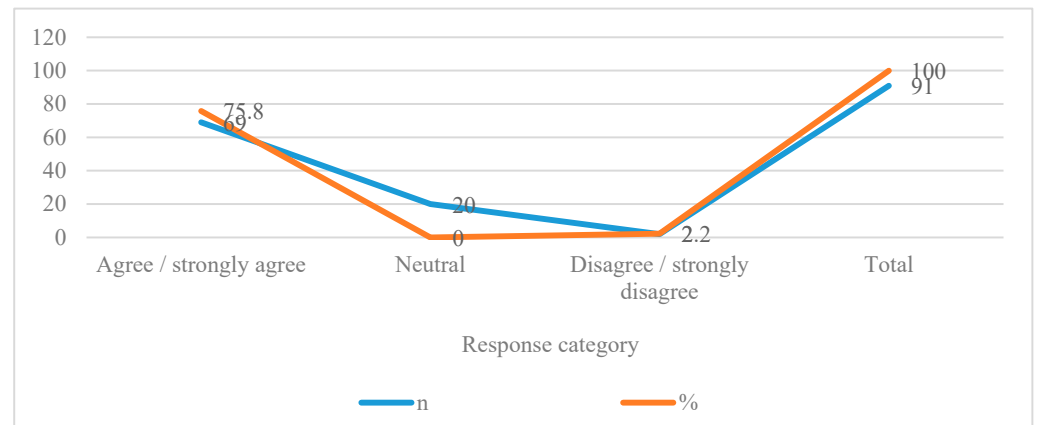
Frequency Category	<i>n</i>	%
Never	44	48.4
Rarely (1–2 times per year)	40	44.0
Sometimes (3–5 times per year)	5	5.5
Often (more than 5 times per year)	2	2.2
Total	91	100.0

#### 4.4. Perceived Value of Collaboration

Perceived value of professional collaboration was assessed on a 1–5 Likert-type scale (1 = minimal importance; 5 = maximal importance). In the survey sample ( $N = 91$ ), the mean score was  $M = 4.05$  ( $SD = 1.15$ ), and the median was  $Me = 4$ . Thus, the sample demonstrates a generally high perceived importance of collaboration. This indicator is reported as a separate row in the summary table of key indicators (see the table in Section 4.6).

#### 4.5. Perceived Impact of Collaboration on the Learning Experience

The questionnaire assessed agreement with the statement that professional collaboration improves students' learning experience. In the survey sample ( $N = 91$ ), most respondents expressed a positive position: 69 students (75.8%) selected “agree/strongly agree”. A neutral position was reported by 20 students (22.0%), whereas negative evaluations were rare: 2 students (2.2%) selected “disagree/strongly disagree” (see Figure 3).



**Figure 3.** Agreement with the statement “Collaboration improves my learning experience” ( $N = 91$ ).

For concise reporting, agreement responses were aggregated into three categories: positive evaluation, neutral position, and negative evaluation.

#### 4.6. Readiness to Participate in the Future

Students’ readiness to participate in joint research/projects in the future was assessed using a five-level ordinal scale (1 = “impossible” to 5 = “fully possible”),  $N = 91$ . The distribution of responses is presented in Table 4. The most frequently selected option was “rather possible” (level 4), chosen by 29 students (31.9%). The “neutral” (level 3) and “fully possible” (level 5) options were equally frequent, with 19 students (20.9%) each. The share of “I doubt” responses (level 2) was 19 (20.9%), while “impossible” (level 1) was selected by 5 students (5.5%). Overall, positive readiness (levels 4–5) was recorded for 48 students (52.7%).

**Table 4.** Key indicators of student professional collaboration ( $N = 91$ ).

Indicator	Value
Prior collaboration experience (Yes/No), $n$ (%)	Yes—37 (40.7); No—54 (59.3)
Frequency of participation in joint projects, $n$ (%)	Never—44 (48.4); Rarely (1–2 times/year)—40 (44.0); Sometimes (3–5 times/year)—5 (5.5); Often (>5 times/year)—2 (2.2)
Perceived value of collaboration (1–5), $M$ (SD), $Me$	$M = 4.05$ ( $SD = 1.15$ ), $Me = 4$
Agreement with the statement “collaboration improves the learning experience”, $n$ (%)	Agree/strongly agree—69 (75.8); Neutral—20 (22.0); Disagree/strongly disagree—2 (2.2)
Readiness to participate in the future (5 levels), $n$ (%)	1—5 (5.5); 2—19 (20.9); 3—19 (20.9); 4—29 (31.9); 5—19 (20.9); levels 4–5: 48 (52.7)

Note. Readiness categories are presented as ordinal levels: 1 = “impossible”, 2 = “I doubt”, 3 = “neutral”, 4 = “rather possible”, and 5 = “fully possible”.

#### 4.7. Single Hypothesis Test: Readiness for Future Participation by Prior Collaboration Experience

To examine the association between prior collaboration experience and readiness to participate in joint research/projects in the future (ordinal scale 1–5), two subgroups were compared: students with prior experience ( $n = 37$ ) and students without prior experience ( $n = 54$ ). Given the ordinal nature of the readiness variable, the comparison was conducted using a two-sided Mann–Whitney U test. Given the focused descriptive–comparative design and the study’s single planned subgroup comparison, Section 4 reports the predefined nonparametric comparison only.

As shown in Table 5, students with prior collaboration experience reported higher readiness ( $Me = 4$ ,  $IQR = 3–5$ ) than students without experience ( $Me = 3$ ,  $IQR = 2–4$ ). The

difference was statistically significant ( $U = 1288$ ,  $p = 0.016$ ), with a rank-biserial effect size  $r = 0.29$ , indicating a small-to-moderate effect.

**Table 5.** Comparison of readiness to participate in the future by prior collaboration experience (Mann–Whitney U).

Group	<i>n</i>	Readiness Me (IQR), 1–5	Mann–Whitney U	<i>p</i>	Rank-Biserial <i>r</i>
Prior collaboration experience: Yes	37	4 (3–5)	1288	0.016	0.29
Prior collaboration experience: No	54	3 (2–4)			

Note. Readiness was coded as levels 1–5 (“impossible” to “fully possible”). A two-sided Mann–Whitney U test was used; *r* denotes rank-biserial correlation.

#### 4.8. Open-Ended Responses: Motivations, Barriers, and Suggestions (Thematic Grouping)

Open-ended responses (Q9, Q10, and Q14) were analysed using thematic grouping. Meaningful units were identified within each response and then consolidated into broader themes; for each theme, the number of mentions (*n*) was recorded. Because a single response could contain multiple themes, totals across themes may exceed the number of valid responses for a given question.

*What supports collaboration and what students like (Q9; valid responses *n* = 86)*

In responses about supportive factors, the dominant themes were knowledge/idea exchange (*n* = 33), communication and expanding connections (*n* = 19), and team-work/mutual support (*n* = 18). Less frequently mentioned themes included interest/engagement (*n* = 10) and professional development (*n* = 5). Illustrative phrasing: “knowledge sharing, exchange of opinions”.

*What difficulties/barriers students report (Q10; valid responses *n* = 87)*

The most frequently mentioned difficulties were communication/coordination problems (*n* = 17), interpersonal barriers (*n* = 13), and time constraints/schedule mismatch (*n* = 10). A notable share of respondents reported no difficulties or found it hard to answer (*n* = 27). Illustrative phrasing: “agreeing on a common time”.

*What the university can do to develop collaboration (Q14; valid responses *n* = 85)*

Suggestions were dominated by requests for regular joint events (*n* = 25). Additional themes included support for clubs/communities and interaction platforms (*n* = 7) and training formats/workshops (*n* = 6). Some students provided no suggestions (*n* = 8). Illustrative phrasing: “organising many events”. Overall, the thematic profile of open-ended responses is consistent with the quantitative pattern: despite high perceived value of collaboration and predominantly positive perceptions of its impact, students most often describe organisational and time-related constraints, while proposals are dominated by event- and club-based formats of interaction.

Across the three open-ended questions, the qualitative responses showed a consistent descriptive pattern (Table 6). Students most often associated collaboration with knowledge exchange, communication, and mutual support, while the main reported barriers concerned coordination, interpersonal interaction, time constraints, and insufficient organisational support. Suggestions for improvement focused mainly on regular joint events and support for student clubs, communities, and interaction platforms. These findings complement the quantitative results by specifying the most frequently mentioned conditions that shape students’ participation in collaborative formats.

**Table 6.** Themes from open-ended responses (Q9, Q10, and Q14): frequency of mentions and illustrative excerpts.

<i>Q9. What supports collaboration/what students like (valid responses n = 86)</i>		
Theme	Mentions, <i>n</i>	Illustrative excerpt (short)
Knowledge and idea exchange	33	"knowledge sharing, exchange of opinions"
Communication and new connections	19	"expanding one's circle (making new connections)"
Teamwork and mutual support	18	"joint work/collaborative tasks"
Interest and engagement	10	"interesting/engaging"
No experience/neutral or negative attitude	8	"I haven't had such experience", "I don't like it"
Professional growth and skills	5	"new professional skills"
<i>Q10. Difficulties/barriers (valid responses n = 87)</i>		
Theme	Mentions, <i>n</i>	Illustrative excerpt (short)
No difficulties/hard to answer	27	"none", "I don't know"
Communication and coordination issues	17	"disagreements", "organisational issues. . ."
Interpersonal barriers	13	"misunderstanding. . .", "disrespect/looking down on others. . ."
Time constraints/schedule mismatch	10	"agreeing on a common time"
Lack of organisational support/conditions	10	"lack of organisational support. . ."
Low motivation/interest	4	"lack of interest. . ."
<i>Q14. What the university can do (valid responses n = 85)</i>		
Theme	Mentions, <i>n</i>	Illustrative excerpt (short)
Regular joint events and activities	25	"organising many events/activities"
No suggestions/hard to answer	8	"I have no suggestions", "nothing"
Support for clubs/communities and platforms	7	"a club. . .", "a group/chat. . ."
Training formats/workshops	6	"training/a course. . ."
Schedule/time optimisation	2	"making the schedule more convenient"
Incentives/encouragement	1	"encouragement/incentives. . ."

Note. *n* denotes the number of responses where the theme was present; one response may contain multiple themes.

To summarise the convergence between the quantitative indicators and the open-ended response themes, Table 7 presents a descriptive joint display. The table does not imply causal relationships; it organises the main observed patterns, the corresponding qualitative themes, and possible context-specific implications that are examined further in the Discussion.

**Table 7.** Joint display linking quantitative patterns, qualitative themes, and bounded leverage points.

Quantitative Pattern (Descriptive Evidence)	Qualitative Themes (Open-Ended Responses)	Bounded Leverage Point (Non-Causal, Context-Specific)
High perceived value of collaboration coexists with low participation frequency.	Time constraints; scheduling conflicts; limited institutional support for coordination.	Establish predictable, low-burden recurring formats (e.g., fixed weekly/biweekly sessions) and clear entry points for participation.
Prior collaboration experience is associated with higher readiness for future participation (association, not effect).	Lower uncertainty when roles and expectations are known; perceived benefits become "realistic" after participation.	Offer low-threshold onboarding activities (short, structured joint tasks) to reduce uncertainty and support early engagement.
Communication barriers are frequently reported as a primary obstacle to effective collaboration.	Coordination difficulties; uneven contribution; misunderstandings; conflict avoidance.	Introduce minimal structure: role rotation, agreed interaction rules, and short peer-feedback routines (e.g., brief check-ins).
Students report valuing collaboration for learning benefits, yet practical barriers dominate reasons for non-participation.	"Organisational friction": lack of time, unclear procedures, and competing academic demands.	Provide institutional scaffolds: templates for collaboration, shared scheduling tools, and facilitator support for coordination.
Open-ended responses provide contextual explanations that converge with the quantitative "attitude-participation gap."	Explanations emphasize feasibility rather than motivation ("want to, but cannot").	Frame implications at the programme/department level: focus on feasibility supports rather than motivational interventions.

Note. The table provides an integrative, non-causal interpretation of convergent patterns across descriptive statistics and thematically grouped open-ended responses. Leverage points indicate plausible organisational supports within the studied context and should be tested in future longitudinal or intervention-based research using validated multi-item measures.

## 5. Discussion

The findings provide a coherent descriptive picture of how teacher-education students perceive professional collaboration within the studied university context. The general pattern is not contradictory, but uneven: collaboration is evaluated positively and is largely associated with learning benefits, yet regular participation in collaborative formats remains limited. This combination is important because it suggests that the key issue is not the rejection of collaboration as such, but the instability of the conditions under which it is enacted in everyday academic life. In this respect, the results support the interpretation of an attitude–participation gap, that is, a situation in which students endorse collaboration in principle but do not engage in it regularly in practice.

This pattern is consistent with the broader logic of cooperative learning research. The literature has repeatedly shown that the value of group work does not arise automatically from the fact of working together; rather, it depends on whether interaction is structured, whether roles and expectations are sufficiently clear, and whether the process includes forms of accountability and communication support (Johnson & Johnson, 2009; Slavin et al., 2003). Read in this light, the present findings suggest that positive student attitudes alone are insufficient for sustained participation. Collaboration appears to be regarded as meaningful but not yet embedded in a stable enough organisational routine to become a regular feature of students' academic experience.

The open-ended responses help refine this interpretation. Students most often described collaboration through ideas of knowledge exchange, mutual support, and broader communication. This indicates that they recognise both the academic and interpersonal value of collaborative activity. At the same time, the barriers they named were predominantly practical and relational rather than ideological: time constraints, coordination difficulties, and communication problems. Such responses are important because they shift the interpretation away from a purely motivational explanation. The students do not generally describe collaboration as unnecessary or undesirable; rather, they describe it as difficult to organise and sustain under existing conditions. This is precisely why the qualitative material adds explanatory depth to the quantitative profile without transforming the study into a causal design.

A bounded interpretive link may also be drawn to the Theory of Planned Behaviour (Ajzen, 1991). Within this perspective, favourable attitudes do not necessarily translate into action when perceived behavioural control is limited. Although the present study does not test this theory directly, the reported barriers are compatible with such a reading: students may value collaboration yet still participate infrequently when scheduling conflicts, weak coordination routines, or uncertainty about interactional expectations make participation less feasible. Thus, the attitude–participation gap observed here is better interpreted as a problem of feasibility and structuring than as a lack of interest in collaboration itself.

The significant difference in future readiness between students with and without prior collaboration experience adds another important layer to the interpretation. Students who had participated in collaborative activities before reported higher readiness for future participation. This pattern is theoretically plausible: prior experience may reduce uncertainty, make expected benefits more concrete, and increase confidence in one's ability to function within joint formats. At the same time, the posttest cross-sectional design does not allow this difference to be interpreted as evidence that prior experience caused higher readiness. An equally plausible reading is that students who are initially more open to collaboration are also more likely both to participate and to report stronger readiness afterwards. For that reason, the result should be retained at the level of association rather than directional influence. Its value lies not in demonstrating an "effect," but in showing that the student population is not homogeneous with respect to collaboration-related orientation.

The practical implications follow directly from this interpretation. If the central problem is not low declared value but low enactment under existing conditions, then institutional responses should focus less on general encouragement and more on reducing organisational friction. The students' own suggestions point in this direction: they mention regular joint events, support for clubs and communities, and formats that make interaction easier to initiate and sustain. When viewed alongside research on peer feedback, facilitation, and guided collaborative learning, these preferences indicate that structured, low-threshold, and predictable forms of collaboration may be more effective than broad motivational appeals alone (Topping, 1998, 2010; Gielen et al., 2010; Gillies, 2004). In teacher education, this has particular relevance because collaboration is not merely a study format; it is also part of the professional culture that future teachers are expected to enter.

The findings also support a more specific practical inference: students may benefit from collaboration formats that combine regularity with modest organisational demands. In contexts where time and coordination are perceived as barriers, large or highly demanding initiatives may not be the most realistic entry point. More feasible options may include short recurring joint sessions, structured peer-feedback routines, role-based micro-tasks, or facilitated project meetings that reduce ambiguity and help establish predictable interaction norms. Such formats would align with the joint display presented in Table 7, where the quantitative profile and qualitative themes converge around the same central issue: collaboration is valued, but its implementation requires clearer institutional scaffolding.

The contribution of the study is not limited to describing students' attitudes toward collaboration. It identifies a specific attitude–participation gap and links this gap to concrete organisational constraints reported by students, thereby providing an empirically grounded basis for designing structured collaboration formats in teacher education.

The limitations of the study should therefore remain central to interpretation. First, the design is posttest-only and cross-sectional, which precludes causal or developmental claims. Second, the sample is voluntary, department-based, and skewed towards Year 3 students, limiting broader generalisability. Third, the study relies on self-reports, and several key variables were measured through brief indicators rather than validated multi-item scales. Accordingly, the results should be interpreted as pragmatic diagnostic markers rather than comprehensive psychometric representations of collaboration processes (Allen et al., 2022; Wanous et al., 1997). In addition, the use of single-item indicators limits the strength of construct validity. These items were appropriate for a brief diagnostic survey, but they cannot capture the full multidimensional structure of collaboration competence, perceived value, or readiness. Future studies should use validated multi-item scales and longitudinal or intervention-based designs to test the stability and predictive validity of these indicators. Nevertheless, the consistency between the quantitative profile and the thematic grouping of open-ended responses strengthens the descriptive coherence of the findings and supports their use as a basis for future, more rigorous longitudinal or intervention-based research.

## 6. Conclusions

This study shows that teacher-education students generally value professional collaboration and associate it with positive learning experiences, yet participate in it irregularly. The findings therefore point to an attitude–participation gap within the studied university context. The open-ended responses suggest that this gap is shaped mainly by feasibility constraints, especially time pressure, coordination difficulties, and communication barriers, rather than by the rejection of collaboration itself. Prior collaboration experience was associated with higher readiness for future participation, but this relationship should be interpreted as descriptive rather than causal.

Overall, the study provides a diagnostic baseline for teacher education by identifying the current collaboration profile of the sample and the institutional supports students consider most relevant. The conclusions remain bounded by the cross-sectional design, the voluntary department-based sample, and the use of brief self-report indicators.

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