

Students' perceived value of a Collaborative Online International Learning-enhanced, team-based healthcare education program: a cross-sectional mixed-methods study.

Fumiyo Matsuda

fumiyo@health.nop.kagoshima-u.ac.jp

Kagoshima University

Saori Yamaguchi

Kagoshima University

Yuriko Ikeda

Kagoshima University

Rika Yatsushiro

Kagoshima University

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Abstract

Background:

As universities increasingly adopt virtual exchange (VE) to promote global and intercultural learning, Collaborative Online International Learning (COIL) has emerged as a widely recognized model. However, many institutions implement adapted COIL-enhanced programs that draw on key COIL principles without fully meeting the formal framework, and little is known about how students perceive their educational value. This study examined students' perceptions of a team-based healthcare education program integrating COIL-enhanced VE; investigated the relative contributions of learner-, instructional process-, and course-level factors; and explored how students interpreted their learning experiences.

Methods:

A total of 104 fourth-year health science students participated in a team-based healthcare education COIL-enhanced VE program involving structured online interactions with international peers. Students completed an 11-item Likert-scale questionnaire and one open-ended question. Pearson's correlation analysis was conducted to examine conceptual coherence among variables, followed by hierarchical regression to identify predictors of perceived value. Open-ended responses were analyzed using text mining, including co-occurrence network analysis and hierarchical clustering.

Results:

Students evaluated the course positively (mean 3.99 ± 0.84). Perceived educational value was strongly correlated with recommendation intention ($r=.73$) and perceived appropriateness of the course content ($r=.63$). The final regression model explained 64.5% of the variance in perceived value, with recommendation intention ($\beta = .539$, $p<.001$) and appropriateness of course content ($\beta = .337$, $p<.001$) emerging as the strongest independent predictors. Text-mining analysis showed that students who rated the course highly emphasized conceptual and holistic learning, such as ICF-based understanding and multiprofessional perspectives, whereas students assigning moderate value focused primarily on communication and collaborative processes.

Conclusions:

Students' perceived educational value was driven primarily by the relevance and meaningfulness of the course content rather than by learner characteristics or instructional processes alone. Clearly positioning COIL-enhanced VEs within the curriculum and helping students to integrate intercultural and multiprofessional experiences may enhance educational effectiveness. These findings provide guidance for designing COIL-enhanced VE programs in health professions education.

Background

The internationalization of healthcare education has become an increasingly important priority in higher education. Against this backdrop, online international collaborative learning has gained prominence as a means of

enabling students from different countries to work together while developing disciplinary knowledge and intercultural competence. Among the various forms of virtual exchange (VE), Collaborative Online International Learning (COIL) has emerged as a widely recognized pedagogical approach [1, 2]. Previous studies have shown that COIL enhances students' global perspectives and communication skills [3], demonstrating the potential of cross-border learning to advance the internationalization of higher education [4].

However, COIL is implemented in diverse ways, and many educational initiatives do not fully satisfy the formal criteria of the COIL framework [5–7]. Programs that adopt key COIL principles without fully implementing the State University of New York (SUNY) model have become increasingly common. Because no standardized terminology exists for these educational approaches, we use the term “COIL-enhanced” to describe educational programs that intentionally integrate core COIL principles—including international collaboration, intercultural exchange, and joint task engagement—without fully meeting all formal requirements, such as jointly designed curricula and fully reciprocal international partnerships.

In healthcare, public health, and social welfare, increasingly complex patient needs require effective collaboration among multiple professions. Consequently, educational programs that foster collaborative practice before graduation have become increasingly important. Interprofessional Education (IPE) is defined as “occasions when two or more professions learn with, from, and about each other to improve collaboration and the quality of care” [8], and the World Health Organization (WHO) has emphasized its importance in strengthening collaborative practice [9]. Effective IPE requires curriculum design grounded in constructivist learning theory, which enables learners to actively develop collaborative competencies [10, 11]. Although higher education institutions have introduced various approaches to foster interprofessional perspectives, their practices differ considerably. The educational program examined in the present study differs from formal IPE, as defined by the Centre for the Advancement of Interprofessional Education (CAIPE). Rather, it is based on the concept of team-based healthcare education, in which students from nursing, physical therapy, and occupational therapy collaboratively examine clients' functional needs and support strategies from multiple professional perspectives.

International VE broadens students' perspectives [2, 3], whereas interprofessional collaborative learning promotes mutual understanding and shared decision-making among healthcare professions [10, 11]. Although COIL-enhanced educational approaches are increasingly adopted in higher education, little is known about how students perceive the educational value of programs that integrate international VE with team-based healthcare education, or which learner-, instructional-, and course-related experiences are most strongly associated with those perceptions.

This study examined students' perceptions of the educational value of a team-based healthcare education program integrating COIL-enhanced VE. Guided by Biggs' Presage–Process–Product (3P) model [12], we used hierarchical regression analysis to examine the relative contributions of learner-, instructional process-, and course-level factors to perceived educational value. We also conducted text mining of students' open-ended responses to explore how they interpreted their learning experiences and constructed educational value.

Methods

Participants

The participants were 123 fourth-year students enrolled in the Department of Health Sciences at the authors' institution, all of whom were registered for the required course, Team-based Healthcare Practicum. The cohort comprised 82 nursing students, 20 physical therapy (PT) students, and 21 occupational therapy (OT) students. The intensive course was delivered in October 2022 and included synchronous sessions with Chung-Ang University Red Cross College of Nursing (South Korea) and asynchronous learning activities with Berea College (United States). Students who completed the full curriculum, including synchronous and asynchronous components, were eligible for the present study.

Following completion of the course, students were invited to complete an anonymous online questionnaire. Participation was voluntary, responses were anonymous, and students were informed that their responses would not affect their course grades. Eight students who did not respond and ten students with incomplete responses were excluded. Consequently, the final analysis included 104 students (Fig. 1).

Course description

The course focused on providing comprehensive support to older adults living in remote island communities. As the primary learning resource, students analyzed a Japanese educational DVD depicting an older adult with cardiac disease residing in an island community. Using the WHO's International Classification of Functioning, Disability, and Health (ICF) framework [13], students examined healthcare, welfare, and long-term care systems in Japan, South Korea, and the United States, as well as approaches to community-based and home healthcare.

The program was developed collaboratively with partner universities in South Korea and the United States and implemented as a COIL-enhanced VE, incorporating core COIL principles including international collaboration, intercultural exchange, and joint task engagement [5–7].

Unlike the CAIPE definition of Interprofessional Education (IPE; “learning with, from, and about each other”), this program was grounded in the concept of team-based healthcare education, which is widely used in Japanese health professions education. Students from nursing, PT, and OT collaboratively examined older adults' functional needs and support strategies from multiple professional perspectives.

Measures

Students completed an online questionnaire comprising 11 items rated on a five-point Likert scale and one open-ended question. The Likert-scale items assessed:

1. Attendance
2. Preparation and review
3. Appropriateness of course content
4. Adherence to the syllabus
5. Perceived difficulty
6. Intention to recommend the course
7. Perceived value of the course
8. Bidirectionality of course communication
9. Instructor strategies in online teaching

10. Ability to follow the progression of online tasks
11. Attitude and motivation in online learning

The open-ended item asked students to describe the factors that contributed to achieving the learning goals.

The survey was administered through the university's learning management system within 2 months of course completion. Only students providing informed consent participated. No personally identifiable information was collected. The study was approved by the Institutional Ethics Review Committee and conducted in accordance with the principles of the Declaration of Helsinki.

Statistical analysis

Descriptive statistics (means, standard deviations, frequencies, and percentages) were calculated for all variables. Pearson's correlation coefficients were calculated to examine the basic relationships among the key variables before hierarchical regression. This step allowed us to confirm conceptual coherence among items, identify potential multicollinearity, and clarify how students' perceptions of course value were associated with related constructs, such as recommendation intention and perceived appropriateness. The dependent variable was the perceived value of the course (five-point Likert scale; higher scores indicated more positive evaluations). The remaining 10 items were entered as independent variables in the hierarchical multiple regression analysis.

Following the 3P model [12], variables were entered sequentially in three theoretically defined blocks:

- Step 1 (Presage: learner-related factors): attendance, preparation/review, and attitude/motivation.
- Step 2 (Process: instructional process factors): bidirectionality of course communication, instructor strategies in online teaching, and ability to follow the progression of online tasks.
- Step 3 (Product: course-level factors): perceived appropriateness of course content, adherence to the syllabus, perceived difficulty, and intention to recommend the course.

In the present study, the Product domain was operationalized as students' evaluative judgments regarding the course and its overall educational value. This theoretically driven sequence was selected to reflect interpretability and avoid data-driven arbitrariness.

Model performance was evaluated using R^2 and ΔR^2 . Standardized regression coefficients (β), standard errors, t-values, and corresponding p-values were calculated.

Multicollinearity was assessed using variance inflation factors (VIFs), condition indices, and variance proportions to confirm no adverse effects on the parameter estimates. Residual diagnostics examined standardized residuals to assess outliers, normality, linearity, homoscedasticity, and independence.

Statistical significance was defined as two-tailed $p < .05$. Statistical analyses were performed using IBM SPSS Statistics version 29.0.

Open-ended responses were analyzed using text mining to identify word frequency patterns, co-occurrence relationships, and thematic structure. Co-occurrence network analysis and hierarchical clustering were conducted using User Local Text Mining (<https://textmining.userlocal.jp/>).

Results

Descriptive statistics

Descriptive statistics are summarized in Table 1. Overall, students evaluated the course positively, with a mean perceived value score of 3.99 (standard deviation [SD] = 0.84). Attendance was high (mean 4.84 ± 0.48), and students reported positive attitudes toward the COIL-enhanced lectures (mean 4.17 ± 0.77), bidirectional communication (mean 4.14 ± 0.85), and the appropriateness of the course content (mean 4.11 ± 0.82). Preparation and review (mean 3.42 ± 0.94) and intention to recommend the course (mean 3.59 ± 0.84) received comparatively lower ratings.

Table 1
Descriptive statistics of key variables (N = 104 participants)

Variables	Mean	SD	N
1. Attendance	4.84	0.48	104
2. Preparation and review	3.42	0.94	104
3. Appropriateness of course content	4.11	0.82	104
4. Adherence to the syllabus	3.92	0.84	104
5. Perceived difficulty	3.42	1.57	104
6. Intention to recommend the course	3.59	0.84	104
7. Perceived value of the course	3.99	0.84	104
8. Bidirectionality of course communication	4.14	0.85	104
9. Instructor strategies in online teaching	3.68	0.84	104
10. Ability to follow the progression of online tasks	3.62	0.83	104
11. Attitude and motivation in online learning	4.17	0.77	104

M, mean; SD, standard deviation. All variables were rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

Correlation analysis

Pearson's correlation coefficients are shown in Table 2. Perceived course value showed strong positive correlations with intention to recommend the course ($r=.73$, $p<.001$) and perceived appropriateness of the course content ($r=.63$, $p<.001$). Moderate positive correlations were observed with bidirectionality ($r=.41$), instructor strategies ($r=.41$), and ability to follow the progression of online tasks ($r=.43$, all $p<.001$). Correlations among the explanatory variables were generally weak to moderate, with no intercorrelations exceeding .60, indicating no evidence of problematic multicollinearity.

Table 2
Pearson's correlations among key variables

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Attendance	—	.15	.31**	.23*	.08	.17*	.21*	.32**	.04	.23*	.34***
2. Preparation and review		—	.18*	.22*	-.13	.11	.10	.26**	.10	.20*	.34***
3. Appropriateness of course content			—	.47***	.07	.58***	.63***	.48***	.46***	.43***	.31**
4. Adherence to the syllabus				—	-.07	.27**	.19*	.34***	.35***	.33***	.20*
5. Perceived difficulty					—	.26**	.18*	.16	.27**	.22*	.08
6. Intention to recommend the course						—	.73***	.41***	.50***	.52***	.34***
7. Perceived value of the course							—	.41***	.41***	.43***	.38***
8. Bidirectionality of course communication								—	.30**	.35***	.42***
9. Instructor strategies in online teaching									—	.45***	.24**
10. Ability to follow the progression of online tasks										—	.49***

$p < .05^*$, $p < .01^{**}$, $p < .001^{***}$.

All correlations are Pearson's r . $N = 104$ for all variables.

Hierarchical regression analysis

Table 3 summarizes the three hierarchical regression models, while Supplementary Table S1 (Additional file 1) presents the full regression coefficients, confidence intervals, and multicollinearity diagnostics for the final model.

Step 1: Learner-related variables

The learner-related variables (attendance, preparation and review, and attitude and motivation) explained 15.1% of the variance in perceived course value ($R^2 = .151$, $F(3,100) = 5.94$, $p < .001$). Among these variables, only attitude and motivation was a significant positive predictor ($\beta = .357$, $p < .001$).

Step 2: Instructional process-related variables

Adding the instructional process variables (bidirectionality of communication, instructor strategies, and ability to follow the progression of online tasks) significantly improved model fit ($\Delta R^2 = .167$, F change(3,97) = 7.94, $p < .001$), increasing the explained variance to 31.9%.

Step 3: Course-related variables

The final model explained 64.5% of the variance in perceived course value ($R^2 = .645$, adjusted $R^2 = .603$, $F(11,92) = 15.22$, $p < .001$). Intention to recommend the course ($\beta = .539$, $p < .001$) and appropriateness of content ($\beta = .337$, $p < .001$) emerged as the strongest independent predictors. Adherence to the syllabus showed a small but significant negative association ($\beta = -.168$, $p = .030$), whereas overall understanding demonstrated a marginal positive effect ($\beta = .181$, $p = .051$).

Regression diagnostics indicated no evidence of problematic multicollinearity or violations of model assumptions (Supplementary Table S1).

Table 3
Hierarchical multiple regression predicting perceived value of the course (N = 104)

Predictor	Model 1 β	Model 2 β	Model 3 β
Attendance	.095	.053	.005
Preparation/review	-.033	-.071	-.025
Attitude/motivation	.357***	.155	.049
Bidirectionality	—	.214*	.026
Instructor strategies	—	.236*	-.044
Ability to follow progression	—	.170	-.032
Adherence to syllabus	—	—	-.168*
Intention to recommend	—	—	.539***
Difficulty	—	—	-.036
Appropriateness of content	—	—	.337***
Overall understanding	—	—	.181
R^2	.151	.319	.645
Adj. R^2	.126	.277	.603
ΔR^2		.167	.327
F	5.94***	7.56***	15.22***

β , standardized regression coefficient.

Model 1 = Presage (learner factors);

Model 2 = Presage + Process factors;

Model 3 = Presage + Process + Product factors.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Text mining: co-occurrence analysis

To maximize contrast while ensuring sufficient textual data for stable network analysis, co-occurrence network analysis compared responses from students assigning perceived course value ratings of 5 (high value) and 3 (moderate value). (see Additional file 2)

Students assigning the highest ratings produced a broad conceptual network centered on professional identity, multiple professional perspectives, and holistic care. Professional terms such as “nursing,” “PT,” and “OT,” along with conceptual words such as “perspective” and “respect,” formed central nodes, indicating strong emphasis on understanding professional roles and valuing different viewpoints, while “living,” “human dignity,” and “support” were closely connected, reflecting an integrated understanding of patient-centered care and collaborative practice.

In contrast, students assigning moderate ratings produced a more process-oriented network centered on “communication,” “group,” and “members,” highlighting a focus on interaction processes. Nearby terms included “opinions,” “active,” and “express,” suggesting emphasis on participation and discussion rather than conceptual integration. Although ICF-related terms appeared, they occupied less central positions, indicating a stronger focus on the learning process than on conceptual understanding.

Text mining: hierarchical clustering

Hierarchical clustering similarly revealed distinct conceptual structures between the two groups (see Additional file 3). Students assigning the highest ratings formed several conceptually distinct clusters organized around professional roles, shared values, and intercultural experiences. Conceptual- and value-oriented terms showed stronger cohesion than action-oriented terms, reflecting a deeper integration of professional identity and intercultural learning.

In contrast, students assigning moderate ratings produced a more tightly interconnected structure centered on communication quality and group interaction, with ICF-related concepts linked primarily through discussion processes rather than broader conceptual understanding.

These findings suggest that students who perceived greater educational value emphasized integration of professional perspectives and holistic thinking, whereas those assigning more moderate ratings focused primarily on the collaborative learning process.

Discussion

This study examined how students construct the perceived value of a team-based healthcare education program integrating COIL-enhanced VE. The findings provide insight into the mechanisms through which students perceive educational value in complex, intercultural, and multiprofessional learning environments. Hierarchical regression analysis showed that intention to recommend the course and perceived appropriateness of course content were most strongly associated with perceived educational value, whereas syllabus alignment showed a small negative

association, and overall understanding showed a marginal positive association. Together, these findings suggest that students perceive greater educational value when learning activities are meaningful, professionally relevant, and sufficiently worthwhile that they would recommend the course to others. These results are consistent with those of previous studies identifying learner satisfaction and willingness to recommend a course as important educational outcomes [14, 15].

The text-mining analysis complemented the quantitative findings by providing deeper insights into how students interpreted and made sense of their learning experiences. Students who rated the course frequently used terms related to respect for diverse professional perspectives, understanding the client's life context, and appreciation of human dignity. Although the present program was not designed as formal IPE according to the CAIPE definition, these patterns are consistent with previous research suggesting that interprofessional learning promotes professional identity development and value integration [16, 17]. The strong co-occurrence of terms such as "living," "human dignity," and "support" further suggests that students attempted to understand clients holistically through the ICF framework, supporting previous research demonstrating the value of ICF for clinical reasoning and person-centered care [18].

In contrast, students who assigned a moderate rating (rating = 3) focused primarily on terms such as "communication," "group," and "members," indicating greater emphasis on interactional processes rather than conceptual integration. These students appeared to value discussion, participation, and group dynamics as central elements of their learning experience. This interpretation is consistent with research on psychological safety in collaborative learning [19] and with social constructivist perspectives emphasizing peer interaction as a foundation for shaping learning outcomes [20].

The hierarchical clustering analysis supported these distinctions. Students assigning the highest rating formed several conceptually organized clusters centered on professional roles, shared values, and intercultural experiences, indicating a more integrated understanding of their learning. In contrast, students assigning a moderate rating produced tightly connected clusters linking communication with an ICF-based understanding of daily life, reflecting a more concrete and process-oriented interpretation of the educational experience. These findings are consistent with educational psychology models proposing that learners progress from action-oriented understanding to more abstract conceptual integration as learning develops [12, 21].

Hierarchical regression further demonstrated that teaching process factors, including bidirectional communication, instructor strategies, and students' ability to follow the progression of online tasks, significantly increased the explanatory power of the model when introduced in Step 2. However, their independent contributions diminished after course-level factors were included in the final model. Rather than suggesting that instructional processes are unimportant, this pattern indicates that their influence may be reflected in students' overall evaluation of the educational experience. This interpretation is consistent with previous studies demonstrating that learner engagement and instructional quality contribute to educational outcomes [22]. Likewise, the frequent appearance of terms such as "easy to talk," "exchange opinions," and "cooperate" in the text-mining analysis suggests that psychologically safe learning environments may have contributed to students' perceived value.

The finding that learner-related and instructional process variables were no longer independently associated with perceived educational value in the final model suggests that positive attitudes and effective instructional strategies alone may not be sufficient to produce meaningful educational experiences. The negative association

observed for syllabus alignment should be interpreted cautiously, as it may reflect shared variance among closely related evaluative variables rather than a genuine negative educational association. Instead, students' evaluations appeared to depend primarily on the perceived relevance and appropriateness of the learning content. In international collaborative learning environments, the extent to which intercultural and multiprofessional experiences connect to students' developing professional identities and future clinical practices may play a central role in shaping perceived educational value. Students assigning the highest ratings demonstrated evidence of integrating their experiences into their own learning, reflecting the qualitative dimension of the Product component in the 3P model [12]. Viewed through this framework, Presage and Process factors contributed to students' learning experiences, whereas Product-related evaluations, particularly perceived content appropriateness and willingness to recommend the course, showed the strongest associations with perceived educational value.

By integrating quantitative and qualitative analyses, this study provides a multifaceted understanding of how students construct educational value in COIL-enhanced team-based healthcare education. The findings underscore the importance of designing learning experiences that are professionally relevant and practically meaningful while supporting students in integrating intercultural and multiprofessional experiences into their developing professional identities.

This study has several limitations. First, it was conducted at a single university, and the participants represented only three health professions, which may limit the generalizability of the findings. Second, the cross-sectional design precludes conclusions regarding developmental processes or long-term educational effects of COIL-enhanced VE. Longitudinal studies are needed to examine how these experiences influence professional growth. Third, although text mining provides a systematic approach to analyzing qualitative responses, analyses based on word frequency and co-occurrence cannot fully capture contextual meaning. Finally, perceived educational value was measured using a self-reported questionnaire that was not specifically developed for COIL-enhanced or IPE contexts. In addition, because all quantitative variables were derived from the same questionnaire, a common method bias cannot be ruled out. Future research should incorporate validated educational measures together with more objective indicators of learning outcomes.

Despite these limitations, this study offers important insights into the design of COIL-enhanced VE within team-based healthcare education and advances understanding of how students construct educational value in international collaborative learning environments.

Conclusions

This study examined the factors associated with students' perceived educational value of a team-based healthcare education program incorporating COIL-enhanced VE. Hierarchical regression analysis demonstrated that willingness to recommend the course and perceived appropriateness of the course content were most strongly associated with perceived educational value, indicating that meaningful alignment between learning content, professional identity, and learning goals is central to students' evaluations of educational value. Text-mining analysis further demonstrated that students assigning the highest value emphasized conceptual and holistic learning, ICF-based understanding, and integration of multiple professional perspectives, whereas those assigning more moderate value focused primarily on communication and collaborative processes.

Viewed through the 3P framework, learner-related and instructional process factors contributed to students' learning experiences, whereas Product-related evaluations showed the strongest associations with perceived

educational value. These findings suggest that, in international collaborative learning environments, students derive educational value when intercultural and multiprofessional experiences are integrated into meaningful professional learning.

To enhance educational effectiveness in COIL-enhanced team-based healthcare education, educators should (1) clearly articulate the relevance of learning activities to professional practice, (2) support students in integrating intercultural and multiprofessional experiences into their developing professional identities, and (3) foster psychologically safe, interactive learning environments.

By integrating quantitative and qualitative approaches, this study provides new insights into how students construct educational value in COIL-enhanced team-based healthcare education. Future research should include multi-institutional and longitudinal designs to further examine the long-term educational impact of COIL-enhanced VE.

Abbreviations

3P

presage–process–product

CAIPE

Centre for the Advancement of Interprofessional Education

COIL

Collaborative Online International Learning

ICF

International Classification of Functioning, Disability and Health

IPE

interprofessional education

OT

occupational therapy

PT

physical therapy

SD

standard deviation

SUNY

State University of New York

VE

virtual exchange

VIF

variance inflation factor

WHO

World Health Organization

Declarations

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Kagoshima University (Approval No. 190312 Epi). All participants received information regarding the purpose of the study, the voluntary nature of participation, and the confidentiality of their responses. Informed consent was obtained from all participants before their participation. This study was conducted in accordance with the principles of the Declaration of Helsinki.

Consent for publication

Availability of data and materials

Competing interests

The authors have no conflicts of interest to declare.

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Author Contribution

FM, SY, YI, and RY conceived the study and collected data. FM performed the statistical analyses. SY contributed to interpreting findings. All authors contributed to manuscript revision and approved the final version.

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References

1. Hackett S, Janssen J, Beach P, Perreault M, Beelen J, van Tartwijk J. The effectiveness of Collaborative Online International Learning (COIL) on intercultural competence development in higher education. *Int J Educ Technol High Educ*. 2023;20:5. Epub.
2. Hackett S, Dawson M, Janssen J, Van Tartwijk J. Defining Collaborative Online International Learning (COIL) and distinguishing it from virtual exchange. *TechTrends*. 2024;68:1078–94.
3. Garizurieta-Bernabe J, Prakaschandra R. Using the COIL pedagogy as a strategy for improving the virtual international educational experiences of students: North-South hemisphere case study. *Act Learn High Educ*. 2024;26:397–411.
4. Borger JG. Getting to the CoRe of Collaborative Online International Learning (COIL). *Front Educ*. 2022;7.
5. Rubin J. Embedding Collaborative Online International Learning (COIL) at higher education institutions an evolutionary overview with exemplars. *uic. Edu/ wp- Conte nt/ Uploa ds/ Sites/ 256/*. 2020/ 08/ Rubin-

- Embedding- Colla Borat Ive- Online- Inter Natio Nal- Learn Ing- at- Higher- Educa tion- Insti Tutio ns. pdf. p. 2017 <https://studyabroad>.
6. SUNY COIL Center. What is COIL? Edu/ Intro Tocoil/ Suny- Coil- What- Is. p. 2020 <https://online.suny/> Accessed August 8th 2022 16.00hrs.
 7. Rubin J, Guth S. The guide to COIL virtual exchange. Stylus Publishing; 2022.
 8. CAIPE. What is interprofessional education? Published 2002. <https://www.caipe.org/what-is-interprofessional-education/>. Accessed January 14, 2026.
 9. World Health Organization. Framework for action on interprofessional education & collaborative practice. Geneva: WHO; 2010. <https://www.who.int/publications/i/item/framework-for-action-on-interprofessional-education-collaborative-practice>.
 10. Azzam M, Puvirajah A. Situating Interprofessional Education curriculum within a theoretical framework for productive engaged learning: integrating epistemology, theory, and competencies. *J Res Interprof Pract Educ*. 2024;14:1–15.
 11. Sundberg K, Reeves S, Josephson A, Nordquist J, Framing IPE, Framing IPE. Exploring meanings of interprofessional education within an academic health professions institution. *J Interprof Care*. 2019;33:628–35. Epub.
 12. Biggs J, Tang C. Teaching for quality learning at university. 4th ed. McGraw-Hill/Society for Research into Higher Education/Open University; 2011.
 13. World Health Organization. International classification of functioning, disability and health (ICF). Geneva: World Health Organization; 2001.
 14. Marsh HW, Roche LA. Making students' evaluations of teaching effectiveness effective: the critical issues of validity, bias, and utility. *Am Psychol*. 1997;52:1187–97.
 15. Spooren P, Mortelmans D, Denekens J. Student evaluation of teaching quality in higher education: development of an instrument based on 10 Likert-scales. *Assess Eval High Educ*. 2007;32:667–79.
 16. Reeves S, Fletcher S, Barr H, Birch I, Boet S, Davies N, et al. A BEME systematic review of the effects of interprofessional education: BEME Guide 39: BEME Guide 39. *Med Teach*. 2016;38:656–68. Epub.
 17. Thistlethwaite J. Interprofessional education: a review of context, learning and the research agenda. *Med Educ*. 2012;46:58–70.
 18. Stucki G, Cieza A, Melvin J. The International Classification of Functioning, Disability and Health (ICF): a unifying model for the conceptual description of the rehabilitation strategy. *J Rehabil Med*. 2007;39:279–85.
 19. Edmondson A. Psychological safety and learning behavior in work teams. *Admin Sci Q*. 1999;44:350–83.
 20. Vygotsky LS. Mind in society. Harvard University Press; 1978.
 21. Biggs J. Teaching for quality learning at university. Open University; 2003.
 22. Martin F, Bolliger DU. Engagement matters: student perceptions of online learning. *Online Learn*. 2018;22:205–22.

Figures

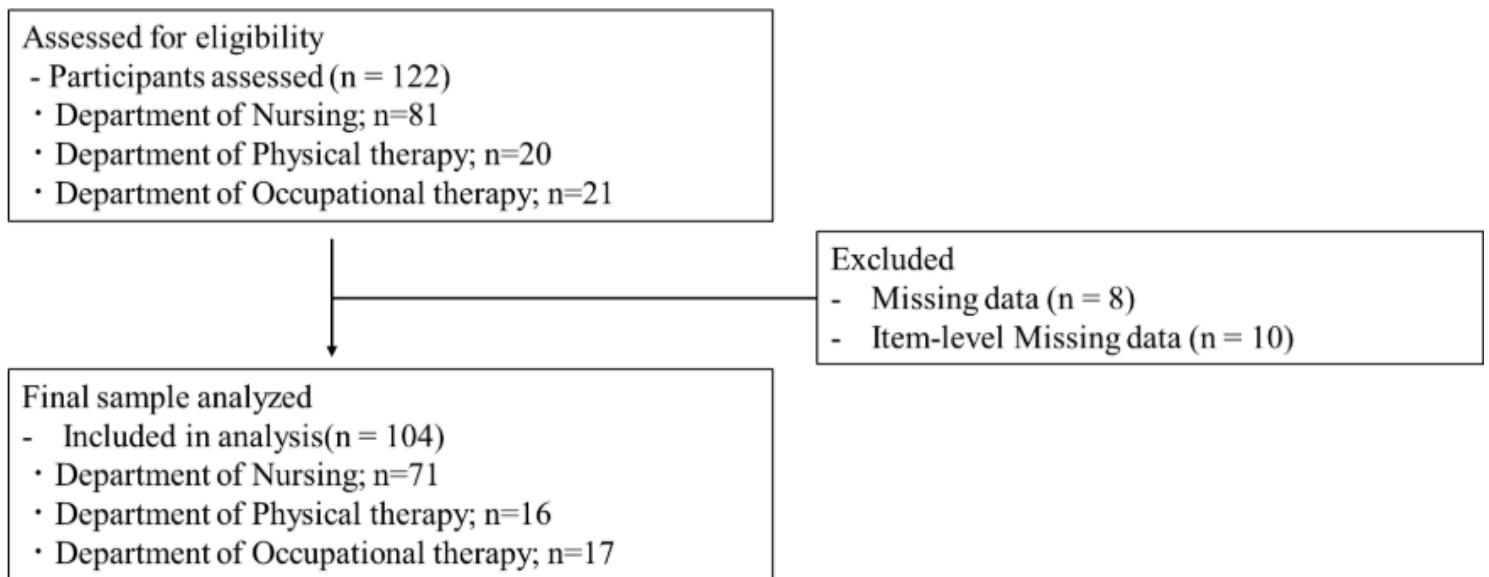


Figure 1

Flowchart of participant selection

Flowchart showing participant enrollment and inclusion in the study. Of the 123 students enrolled in the Team-based Healthcare Practicum, eight did not complete the questionnaire and 10 submitted incomplete responses. A total of 104 students were included in the final quantitative and qualitative analyses.

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

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