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Development of Questionnaire for Students' Self-Reflection Abilities in Interprofessional Education

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ABSTRACT

Effective interprofessional collaborative practice (IPCP) requires not only collaboration competencies but also strong professional and interprofessional identities, which require personal, professional, and interprofessional reflection. No instrument is available to assess students' reflection abilities covering their personal, professional and interprofessional identities. Therefore, this study developed a student self-reflection questionnaire in the interprofessional education (IPE) context. This study used an exploratory sequential mixed-methods approach, which began with a scoping review and focus groups (FGs) with 122 respondents, followed by an expert review, cognitive interviews (involving 14 fourth-year students), and a pilot study (involving 52 fourth-year students). The last step was validation using the exploratory factor analysis (EFA) method involving 630 seventh-semester students from medical and health professions. The scoping review and FGs suggested 92 items that were reviewed by eight experts and resulted in 64 relevant items. Fifty-three items were selected through cognitive interviews, and 50 items resulted from the pilot study. A total of 50 items were analysed with EFA and resulted in three factors: (a) self-awareness and the development of interprofessional collaborative teams (22 items, Cronbach alpha: 0.946); (b) openness/readiness and efforts for adaptation in interprofessional collaborative teams (14 items, Cronbach alpha: 0.938); and (c) reliability and interaction in interprofessional collaborative teams (14 items, Cronbach alpha:

0.824). Each factor contained personal, professional, and interprofessional aspects. This study resulted in a valid and reliable instrument for assessing students' self-reflection abilities in IPE and exploring students' IPE self-reflection in the personal, professional and interprofessional aspects to support identity formation and interprofessional collaboration.

Keywords: *Reflection, Interprofessional education, Interprofessional collaborative practice, Identity, Personal, Professional, Interprofessional, Questionnaire*

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INTRODUCTION

Interprofessional collaborative practice (IPCP) is crucial for the quality improvement of patient care and safety (1–3). Effective IPCP requires not only collaborative competence but also strong professional and interprofessional identities (dual identity). Individual commitment and consistency in the attitudes, behaviour and internalisation of one's professional and interprofessional values are necessary so that one can act as a professional who can collaborate; this can only be realised through a strong dual identity. Furthermore, professional identity is the most important part of professionalism required in providing healthcare (4–6).

Professional identity is formed through personal identity and the internalisation of various experiences in a process of socialisation (7). Personal identity is an individual's subjective feeling or understanding of who they are, displayed through their language, appearance and daily behaviour in their interactions with others (5). Personal identity linked and adapted to the context of a person's profession is a form of professional identity. Therefore, personal identity and professional identity are an inseparable unit (4, 5, 8). Professional identity is an individual's image shown in their consistent attitude, values and behaviour expected from a person who thinks, acts and feels like a professional; it is a result of the internalisation of the values, norms and characteristics of the profession, which are gradually and continuously developed in an individual (9). Professional individuals are those who can adapt continuously in accordance with the growing needs of health services (10).

A strong interprofessional identity is reflected in an individual who represents their profession competently and confidently, and he or she also shows the capacity to collaborate in an interprofessional team (11). Interprofessional identity is characterised by three related elements, namely a sense of belonging, commitment and belief (12), and it is formed through socialisation within the interprofessional health community (13). A strong interprofessional identity leads to individual commitment and consistency in attitude, behaviour and the internalisation of professional–interprofessional values that enable further collaboration (14). Because of the increasingly complex challenges in the IPCP context as well as continuously changing patient characteristics, fostering the professionalism of interprofessional teams is becoming even more important. In this way, team members are more likely to adapt when providing healthcare and identifying their own needs as professionals and health providers. Interprofessional teams require professional individuals who are adaptive and have a dual identity or even a triad identity (personal, professional and interprofessional identities).

The development of personal, professional and interprofessional identities through the socialisation process requires self-reflection (13, 15–18). A person can find meaning from their surroundings, experiences and the dilemmas they face (19) to make room for positive changes and obtain their desired personal, professional and interprofessional identities. Reflection sharpens an individual's ability to be sensitive to and recognise learning opportunities and challenges around them and to be responsive and adaptive in their self-development journey. Although self-reflection plays a major role in the formation of professional and interprofessional identities supporting IPCP and serves as an important skill in interprofessional education (IPE), it has not been discussed much in the current literature. Most previous work has discussed reflection for the development of professional identity or dual identity (10, 19–30). One notable study by Zarezadeh et al. (31) reported self-reflection in the context of personal, professional and interprofessional in the format of reflective writing instruments.

Few studies have been conducted on reflection in the context of IPE. Despite the understanding that the process of forming an interprofessional identity requires "layered" reflection at the personal, professional and interprofessional levels (31), the existing literature discusses interprofessional reflection without personal and professional reflection (32–37). Meanwhile, reflection in the IPE context has only been developed through reflective writing regarding the mastery of IPE competencies without any assessment of a person's self-reflection abilities at the personal, professional and interprofessional levels (31, 35, 36, 38–42).

Considering the importance of forming professional and interprofessional identity through self-reflection (43–46), along with the need to assess the achievement of self-reflection abilities as a collaboration competency, a valid instrument for assessing self-reflection in the IPE context is needed to support students' learning process as part of formative assessment (assessment for learning), summative assessment (assessment of learning), and student learning needs (assessment as learning) (47). Assessment can motivate student learning (assessment drives learning) (48); therefore, reflection also requires assessment to further stimulate student learning. Therefore, this study developed an instrument to assess self-reflection in the IPE context that includes personal, professional and interprofessional aspects.

METHODS

The development of the IPE self-reflection questionnaire, named the Reflection to Enhance perSonal, Profesional, intErprofessional Collaboration Triad identity (RESPECT) questionnaire by the researchers, followed the steps for instrument development described by Artino et al. (49): (a) a literature review in the form of a scoping review; (b) focus group discussions (FGDs); (c) synthesis of the results of the literature review and FGDs; (d) preparation of questionnaire items; (e) expert review; (f) cognitive interviews for the interpretation of questionnaire items; and (g) a pilot study. A sequential exploratory mixed-methods study was conducted (50); the study began with an exploration of qualitative data followed by a quantitative study utilising appropriate statistical analysis methods. The research was conducted from April 2023 to January 2024.

Data Collection

Stage 1: Item development process

A scoping review of the literature was conducted according to the steps described by Arksey and O'Malley (51). With a focus on "how is self-reflection developed in IPE?", a literature search was conducted using the PubMed, Google Scholar, Cochrane, Science Direct and Springer databases, in April 2023. A systematic search was carried out in each database using the following keywords: medical or health profession, reflection, questionnaire, assessment and IPE. A snowball technique—searching references through the bibliography of each article—was also used to identify additional information. Expert opinions or reviews, letters to the editor, secondary sources from literature/narrative/systematic reviews and articles reporting interprofessional learning in contexts outside of medicine and health were excluded. The search results were filtered according to the title, abstract and full article. Each researcher assessed the selected articles, and the data were then extracted. Differences in opinion between researchers were discussed until mutual agreement was reached. Researchers then synthesised the results of all articles and presented them in the form of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) checklist, as presented in Figure 1.

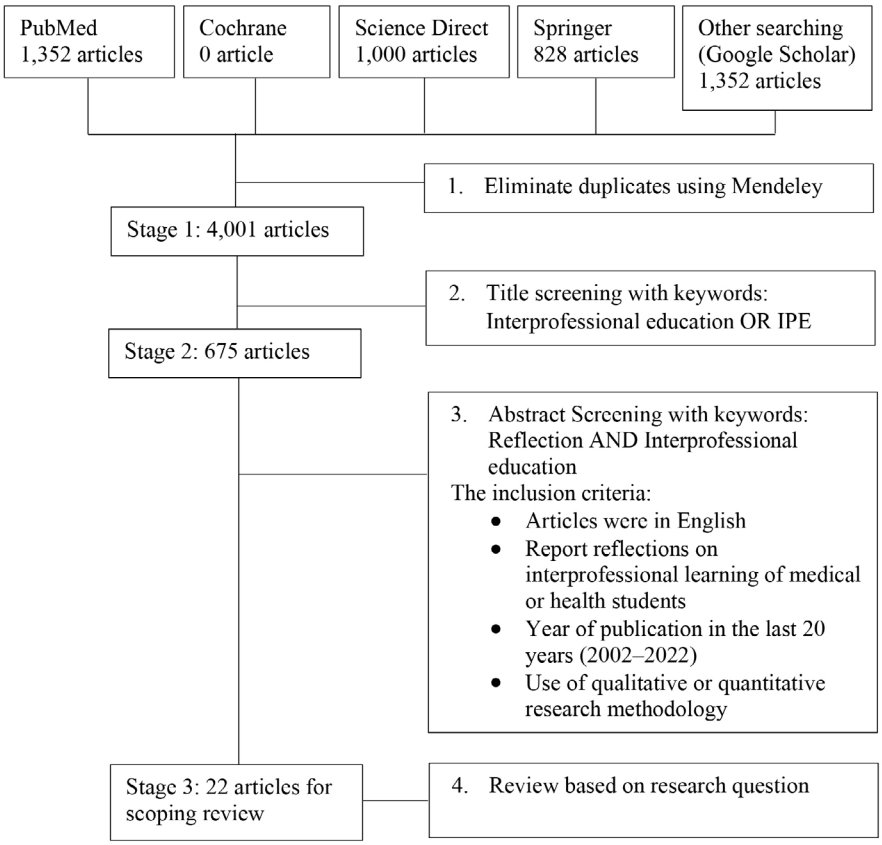

Figure 1: Systematic search and selection diagram.

The development of questionnaire items also considered the perceptions of stakeholders (students, teachers and health practitioners), which were explored through focus groups (FGs). A maximum variation sampling technique was employed by considering various backgrounds, such as gender (48 males and 74 females), type of study programme

(46 respondents in medicine, 24 in pharmacy, 25 in nursing and 22 in physiotherapy), and position (53 students, 39 lecturers and 30 health workers). The FGs involved 122 participants, comprising 53 fourth-year University of Muhammadiyah Malang (UMM) academic/preclinical students (24 medical, 10 pharmacy, 9 physiotherapy and 10 nursing students); 39 teaching staff members (11 medical, 9 pharmacy, 9 physiotherapy and 10 nursing staff members) and 30 health workers at UMM Hospital (11 medical professionals, 5 pharmacy professionals, 4 physiotherapy professionals, 5 nursing professionals, 4 nutritionists and 1 midwife). Participation was voluntary. The 122 participants in the first FG phase were divided into 12 FGs, which were held in April 2023. The FGs were conducted at the Faculty of Medicine on the UMM campus and UMM Hospital and were moderated by the researchers using the question guide for each group of students, teaching staff and health workers. The question guide included various questions, such as "according to your experience, what were the obstacles and challenges in performing a self-reflection in IPE?" for students; "how was your experience in facilitating/teaching self-reflection to students?" for teaching staff; and "what is your experience in reflecting on the context of interprofessional collaboration in health services?" for health workers. Each FG lasted approximately 60 to 90 minutes. Each FG was recorded, and the data were transcribed verbatim, followed by thematic analysis using the steps for coding and theorisation (SCAT) (52). The authors GSP and DS independently grouped the subthemes into each component of the IPE self-reflection theme (personal reflection, professional reflection and interprofessional reflection), and any disagreements were resolved through discussion. All authors participated in refining the results. To ensure trustworthiness, we performed member checking with eight FG participants.

Reflexivity

The authors GSP, DS, AF and TNK are medical education experts and medical professionals, and the other three authors (MR, SW and RAW) are medical doctors and teaching staff members. The first four authors have been involved in IPE course development in health sciences, and the final three authors are IPCP practitioners. Therefore, their perspectives and experiences contributed to the interpretation of the information in this study. The main authors (GSP and DS) led the FGs by inviting respondents from various professions. The moderator may have been familiar with some study participants, but the data analysis for each FG was conducted by a different author to ensure objectivity.

Stage 2: Validation process and item refinement

Expert validation

Each item in the instrument was assessed by a panel of eight experts using the content validity index (CVI). The experts rated the relevance of each item on a 4-point rating scale (1 = not relevant; 4 = very relevant and succinct). The CVI for each item is the proportion of experts who rate that particular item as having valid content (a rating of 3 or 4), whereas the CVI for the whole questionnaire is the proportion of total items judged to have valid content (53). The expert panel consisted of two nurses, one pharmacist, and five doctors (two medical education experts and three specialists), who were asked to score the relevance and appropriateness of each item in the questionnaire to assess health profession students' self-reflection abilities in IPE and to provide comments or suggestions on the related items. An item with a CVI above 0.83 was considered valid. All experts met the following criteria: medical education experts, experience in IPCP or IPE practice or studies, and past or present involvement in managing IPE or IPCP courses. An item with an unacceptable CVI was assessed in terms of its importance before undergoing modification or deletion.

Cognitive interview

After the expert review, online cognitive interviews were conducted with 14 eighth-semester medical and health professional students (3 medical students, 3 pharmacy students, 3 physiotherapy students, and 4 nursing students; 6 males and 8 females in total) who did not participate in previous stages or the pilot study to assess the students' interpretation and perception of each item in the drafted instrument. The research team quantitatively analysed the results of the cognitive interviews and used them to determine whether a statement item needed to be revised, eliminated, or maintained and check the content validity of the instrument.

Pilot study

Following cognitive interviews, the instrument draft was subjected to a pilot study in which it was administered to 52 eighth-semester medical and health professional students (17 medical students, 15 pharmacy students, 10 physiotherapy students and 10 nursing students; 8 males and 44 females in total) who were not involved in the cognitive interviews. Participants were asked to provide an answer to each item along with comments on the items, especially regarding the relevance of the content, the clarity of the sentences, and the potential ambiguity of the sentences. Data from the pilot study were analysed with the Pearson correlation test (to assess validity) and reliability testing (to assess item correlation and Cronbach's alpha values).

Exploratory factor analysis (EFA)

Factor analysis was conducted to determine the construct validity of the instrument. Using the total sampling method, the instrument draft was administered to 635 fourth-year medical and health professional students (excluding students who already participated in the pilot study); the response rate was 99.2% (630 students: 129 medical students, 289 pharmacy students, 106 physiotherapy students and 106 nursing students; 114 males and 516 females). The data were entered into IBM SPSS version 26, and EFA with varimax rotation was conducted to determine the number of subscales in the instrument and identify items that corresponded to each subscale. Items included in the subscale were required to have a minimal factor loading of 0.3 (54). The internal consistency was evaluated by calculating the Cronbach's alpha value; a value of > 0.8 was considered reliable. Confirmatory factor analysis (CFA) was not conducted because this study developed a new instrument, hence it was not possible to test the hypothesis relationship pertaining to an already existing instrument as CFA did.

RESULTS

Scoping Review

The scoping review stage of 22 articles produced 57 subdomains, which were divided into 17 personal reflection subdomains, 13 professional reflection subdomains and 27 interprofessional reflection subdomains. The 57 subdomains obtained from the scoping review were grouped into three IPE self-reflection domains, building on Zarezadeh's theoretical framework.

The search results for the scoping review yielded one article that only discussed personal reflection, one article that discussed professional reflection alone, and three articles on interprofessional reflection alone. Eight articles discussed the content of the personal, professional, and interprofessional reflection subdomains, and the remaining nine articles discussed the content of personal and interprofessional reflection or a combination of professional and interprofessional reflection. The 15 resulting articles included in the scoping review involved respondents from the medical profession, 11 articles involved respondents in the nursing field, 9 articles involved respondents in the pharmacy field and 6 articles involved respondents in the physiotherapy field. Other professional fields mentioned in the included articles were biochemistry, health administration, speech therapy, nutrition, oral health or dentistry, public health, social welfare, occupational therapy and medical technology.

The scoping review produced 17 subdomains for personal reflection, including empathy, self-awareness and self-control of emotions. Furthermore, 13 subdomains were determined for professional reflection, including understanding professional roles and responsibilities, professional boundaries and professional contribution to health services. Finally, 27 subdomains were determined for interprofessional reflection, including the needs and perceptions of other professionals, feeling trusted by other professionals, openness of information and collaboration, cooperation, attachment to an interprofessional team (sense of belonging), effective interprofessional relationships and collaboration competence.

Focus Groups

The FGs produced 33 subdomains: 3 personal reflection subdomains, 4 professional reflection subdomains and 26 interprofessional reflection subdomains. These results were then combined with the subdomains produced by the scoping review. The combined results of the scoping review and the FGs resulted in 90 subdomains, which were divided into 20 personal reflection subdomains, 17 professional reflection subdomains and 53 interprofessional reflection subdomains; IPE was used as the context when developing questionnaire items. All authors were involved in forming the questionnaire items. A total of 92 items were divided into 3 domains: personal reflection (20 items), professional reflection (17 items) and interprofessional reflection (55 items). Two subdomains, namely effective communication in a team and acceptance of the limitations of other professions, had two items each because they emerged frequently in the FGs.

Expert Review

Five items had a CVI of less than 0.83 (CVI = 0.75), and 23 items had a CVI of less than 1.00 (CVI = 0.88); thus, 28 out of 92 items had a CVI of less than 1.00. Theoretically, because 8 experts were involved, the CVI cut-off was 0.83; however, because of the large number of questionnaire items, the authors decided to only use items with a value of 1 because this value reflects complete agreement among experts. The authors removed 28 items and combined them with similar items, and they improved the sentence structure in the instrument according to the recommendations from experts (Figure 2); thus, the final results from the experts' review included 64 statement items in the IPE self-reflection questionnaire (14 personal reflection items; 15 professional reflection items, and 35 interprofessional reflection items).

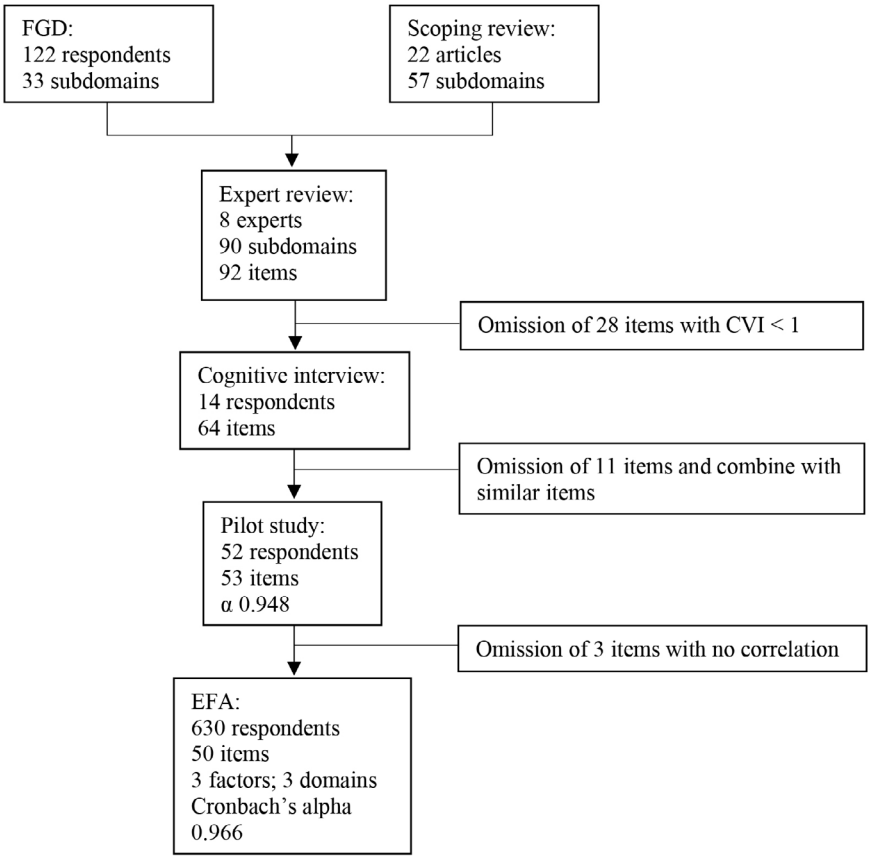

Figure 2: Flow chart of instrument development stages.

Cognitive Interview and Pilot Study

The students felt that the questionnaire still contained too many items and that many statements were similar; therefore, they recommended combining similar items to reduce the overall number of items, and they expressed the need for consistency in terms such as limitations or weaknesses. After the cognitive interviews, 11 items were omitted, reducing the number of items on self-reflection in the IPE assessment questionnaire from 64 items to 53 items (13 personal reflection items, 9 professional reflection items, and 31 interprofessional reflection items).

The pilot study of 53 items revealed two unfavourable items that were invalid and showed no correlation ("I find it difficult to accept my own weaknesses": $p = 0.165$, $r = 0.134$; "I feel that my competence to collaborate is still not optimal": $p = 0.393$, $r = 0.063$) and one unfavourable item that was valid but showed no correlation ("I find it difficult to identify shortcomings in my profession in an interprofessional health care team": $p = 0.027$; $r = 0.254$); thus, these three items were removed. Therefore, the pilot study resulted in a 50-item questionnaire, which moved to the EFA stage.

EFA

The results of the statistical analysis showed that the EFA requirements were met. The Kaiser Meyer Olkin (KMO) value, which measures sampling adequacy, shows a figure of 0.972 ($p < 0.001$), which exceeds the accepted limit, thus indicating that the factor analysis carried out is in accordance with the existing data. Bartlett's test of sphericity showed significant results (x^2: 20149.857, $p < 0.001$). The factor analysis showed minimal variation, as indicated by the even distribution of data (Figure 3), and it was thus considered suitable. Based on the eigenvalue> 1, scree plot and parallel analysis (54), three factors were extracted (Table 1 and Figure 3). Table 1 summarises the results of the IPE self-reflection questionnaire, which contained 50 items with three factors. The three factors had eigenvalues of 41.044; 5.401, and 2.729, with a variation of 49.174%. The reliability analysis showed a Cronbach's alpha value of 0.966 for the 50 items on the IPE self-reflection questionnaire. The three factors resulting from the analysis of the student self-reflection questionnaire in IPE were F1, self-awareness and development of interprofessional collaboration teams; F2, openness/ readiness and adaptation efforts in interprofessional collaboration teams; and F3, reliability and interaction in interprofessional collaborative teams (Table 1). Each factor included personal, professional and interprofessional reflection (Figure 4).

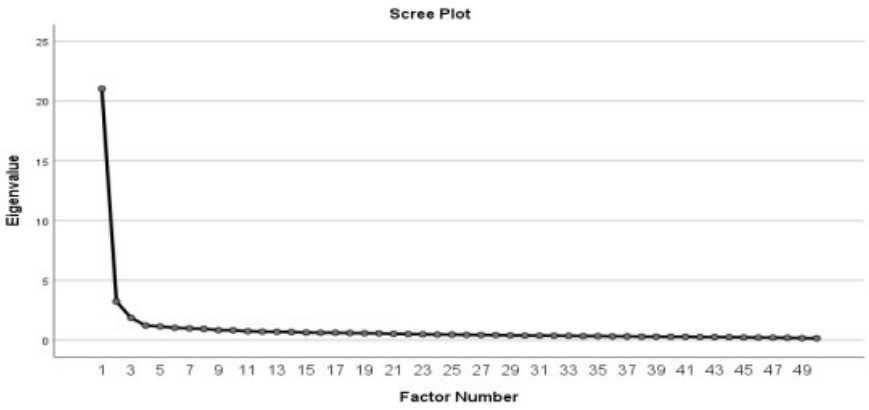

Figure 3: The scree plot demonstrating the component numbers alongside the eigenvalue identifying the number of factor components.

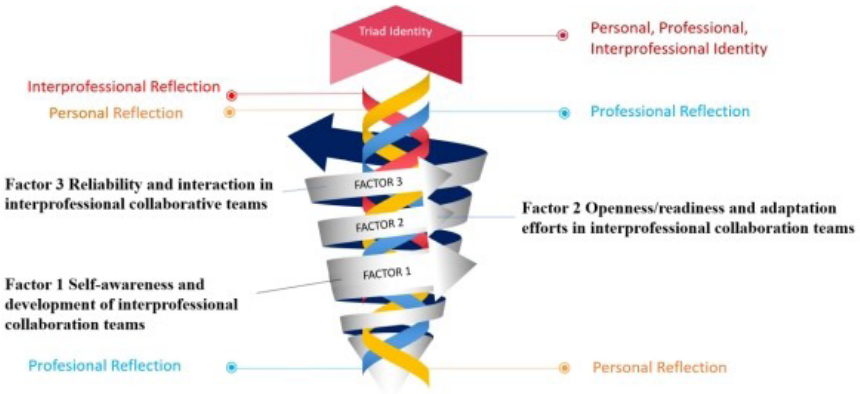

Figure 4: Reflection for triad identity.

Table 1: Final RESPECT instrument based on the EFA results

	Questions	Component		
		F1: Self-awareness and development of interprofessional collaboration teams	F2: Openness/ readiness and adaptation efforts in interprofessional collaboration teams	F3: Reliability and interaction in interprofessional collaborative teams
Q1.	Critical thinking (personal reflection): I am able to analyse the influence of learning experiences on the improvement of my abilities	0.473		
Q2.	Self-awareness (personal reflection): I am able to identify my abilities	0.499		
Q3.	Understanding the impact of behaviour on others (interprofessional reflection): I understand the impact my behaviour has on others	0.497		
Q4.	Perception about reflection (personal reflection): After performing self-reflection, I obtained a lot of insights	0.501		
Q5.	Understanding the impact of behaviour on others (personal reflection): I understand the impact my behaviour has on others	0.543		
Q6.	Awareness of personal role and responsibility (personal reflection): I am aware of my duties in an interprofessional team	0.583		
Q7.	Understanding the roles and responsibilities of the profession (professional reflection): I understand my professional role in an interprofessional healthcare team	0.633		
Q8.	Understanding the roles and responsibilities of other professions (interprofessional reflection): I understand the role of other professions in interprofessional healthcare service	0.495		
Q9.	Openness to feedback (personal reflection): I am open to feedback others give to me	0.535		
Q10.	Motivation to grow (personal reflection): I try to improve my weaknesses to further develop myself	0.583		

(*Continued on next page*)

Table 1: (*Continued*)

Questions		Component		
		F1: Self-awareness and development of interprofessional collaboration teams	**F2: Openness/ readiness and adaptation efforts in interprofessional collaboration teams**	**F3: Reliability and interaction in interprofessional collaborative teams**
Q11.	Resilience and adaptability (interprofessional reflection): I am able to adapt well to other people, new environments, as well as changes/innovations	0.520		
Q12.	Communicative (personal reflection): I try to be communicative with everyone	0.570		
Q13.	Responsive (interprofessional reflection): I try to provide the appropriate response when interacting with other professions in the team	0.613		
Q14.	Initiative (interprofessional reflection): When carrying out my role as a member of an interprofessional team, I do everything without being asked	0.479		
Q15.	Activeness (personal reflection): I participate actively in a team	0.555		
Q19.	Trust in other professions (interprofessional reflection): I try to provide trust when interacting with other professions	0.496		
Q20.	Empathy (personal reflection): I easily empathise with other people's feelings	0.473		
Q21.	Personal discipline (personal reflection): I have high discipline	0.482		
Q22.	Commitment (professional reflection): I have a commitment to the profession; therefore, I always try to do my best in the team	0.608		
Q23.	Perception of personal profession (professional reflection): I have a positive perception of my profession	0.628		
Q24.	Perception of other professions (interprofessional reflection): I have a positive view of other professions	0.559		

(*Continued on next page*)

Table 1: (*Continued*)

	Questions	Component		
		F1: Self-awareness and development of interprofessional collaboration teams	**F2: Openness/ readiness and adaptation efforts in interprofessional collaboration teams**	**F3: Reliability and interaction in interprofessional collaborative teams**
Q25.	Problem-solving (professional reflection): I try to solve problems in interprofessional teams	0.485		
Q27.	Need for other professions (interprofessional reflection): I need other professions to be able to provide the best healthcare services		0.540	
Q28.	Openness to collaboration (interprofessional reflection): I try to learn about other professions so that collaboration runs better		0.464	
Q30.	Understanding of other professions' points of view (interprofessional reflection): I understand differences of opinions of other professions		0.545	
Q40.	Experiencing the benefits of collaboration (interprofessional reflection): I feel the benefits of interprofessional team collaboration		0.480	
Q41.	Teams' perceptions of patient safety (interprofessional reflection): The patient's interests are the priority for the interprofessional team		0.622	
Q42.	Acceptance of the limitations of other professions (interprofessional reflection): I am able to accept the shortcomings of other professions in the performance of interprofessional teams		0.564	
Q43.	Courage in facing challenges (interprofessional reflection): I am ready to face changes required in interprofessional teams		0.534	
Q44.	Admitting mistakes and apologising (interprofessional reflection): I dare to admit my mistakes and apologise to the members of my interprofessional team		0.632	

(*Continued on next page*)

Table 1: (*Continued*)

	Questions	Component		
		F1: Self-awareness and development of interprofessional collaboration teams	**F2: Openness/ readiness and adaptation efforts in interprofessional collaboration teams**	**F3: Reliability and interaction in interprofessional collaborative teams**
Q45.	Leadership in team (interprofessional reflection): I try to build a pleasant collaboration atmosphere in interprofessional teams		0.545	
Q46.	Interprofessional concern/ collegiality (interprofessional reflection): I involve other professions in interprofessional team discussions		0.682	
Q47.	Encouragement (interprofessional reflection): I try to give support to other professions		0.746	
Q48.	Humanism (interprofessional reflection): I try to appreciate other professions		0.766	
Q49.	Professional ethics (professional reflection): I try to maintain my professional ethics when interacting with other professions		0.775	
Q50.	Interprofessional ethics (interprofessional reflection): I protect the reputation of the interprofessional team members		0.693	
Q16.	Contribution to the team (interprofessional reflection): I have a big role in the group dynamics of my interprofessional team.			0.579
Q17.	Self-confidence (personal reflection): I feel confident when working with other professions			0.622
Q18.	Feeling trusted by other professions (interprofessional reflection): I feel trusted by other professions in the team when carrying out tasks			0.624
Q26.	Professional independence (professional reflection): I try to carry out my duties independently as a professional			0.464

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Table 1: (*Continued*)

	Questions	Component		
		F1: Self-awareness and development of interprofessional collaboration teams	**F2: Openness/ readiness and adaptation efforts in interprofessional collaboration teams**	**F3: Reliability and interaction in interprofessional collaborative teams**
Q29.	Professional ego (professional reflection): I need recognition for my profession, so it is difficult to accept the opinions of other professions			−0.486
Q31.	Conflict management (interprofessional reflection): I try to carry out interprofessional mediation in a team			0.527
Q32.	Tolerance (interprofessional reflection): I am not easily offended when interacting with other professions			0.343
Q33.	Emotions/feelings involved in interprofessional collaboration (interprofessional reflection): I find it difficult to control negative emotions/feelings that arise when I interact with other professions			−0.312
Q34.	Evidenced-based information communication (professional reflection): I always try to convey information that is evidenced-based using good scientific reasoning when communicating with peers			0.431
Q35.	Information disclosure/ communication (interprofessional reflection): I try to give information to other professions about the duties of my profession.			0.452
Q36.	Teamwork: I easily cooperate with other professions in solving team problems			0.570
Q37.	Sense of belonging (interprofessional reflection): I have a strong relationship with my interprofessional team			0.633
Q38.	Courage to express opinions (interprofessional reflection): I have the courage to express opinions, including expressing discomfort in the team			0.645

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Table 1: (*Continued*)

Questions	Component		
	F1: Self-awareness and development of interprofessional collaboration teams	**F2: Openness/ readiness and adaptation efforts in interprofessional collaboration teams**	**F3: Reliability and interaction in interprofessional collaborative teams**
Q39. Perception on environmental safety and comfort (interprofessional reflection): I feel comfortable in an interprofessional team			0.638
Eigenvalues	21.035	3.235	1.870
Percent of variance	41.044	5.401	2.729
Total variance			49.174
Cronbach's alpha coefficient	0.946	0.938	0.824
Item number	22 items	14 items	14 items

DISCUSSION

This study implemented the steps of questionnaire development described by Artino et al. (49) and resulted in a 50-item questionnaire to assess self-reflection on personal, professional, and interprofessional aspects. A total of 90 subdomains were developed into 92 items combined from the results of a scoping review and FGDs, involving unfavourable items to encourage respondents to read each statement more carefully (55). The scoping review and FGD results showed that layered self-reflection was needed in the personal, professional, and interprofessional domains, each of which included several subdomains.

The pilot study, which involved 53 items obtained from the cognitive interviews, resulted in the omission of three more items that showed no correlations, although one of these items was valid. These three items were all unfavourable. This finding is interesting because it assumes that the respondents were not accustomed to answering unfavourable questionnaire items. These three omissions did not affect the instrument validity even though they were not combined with other items; this is because they were already meaningfully represented by several other items. The reliability of the remaining 50 items also showed superior results because of the increase in Cronbach's alpha from the original α of 0.948 (53 items) to 0.9666 (50 items); thus, the omission of these three items increased the instrument's reliability rather than decreasing it. After the pilot study, the items used in the EFA stage were not modified further. The 50 items that remained after the pilot study were arranged in a random order so that the respondents switched between personal, professional and interprofessional reflection when filling out the questionnaire. The low factor loadings for two items (Q29, Q33) are likely due to being reverse items that were incorporated in the questionnaire to prevent possible response biases from the respondents (56). Another possible explanation for these low factor loadings is that both items concern emotional and professional ego which highlights individual emphasis in interprofessional communication which are not necessarily aligned with the collectivist culture in the Asian setting (57).

The results of the pilot study and EFA showed that this IPE self-reflection questionnaire has satisfactory validity and reliability. We conducted an item analysis in the development of the questionnaire to ensure validity, which consisted of content validity, the response process, and internal structure, but we did not assess relationships with other variables or consequences. Content validity was obtained through FGs and expert reviews using the CVI, the response process was obtained through cognitive interviews and a pilot study, and internal structure was assessed with the results of EFA and reliability.

The three factors that emerged from the EFA results are interesting because personal, professional and interprofessional reflection did not manifest as separate layers or aspects, and one did not proceed to the other following the main theoretical framework of IPE self-reflection that was used (31), but in practice, aspects of these layers were integrated into each factor proportionally according to the concepts contained in that factor. Factor 1—self-awareness and the development of interprofessional collaborative teams—is needed as a strong foundation for individuals to collaborate. Individuals who are self-aware and develop interprofessional teams are expected to be more open and ready to collaborate and make maximum adaptation efforts in interprofessional collaborative teams, as reflected in factor 2. Openness and readiness for collaboration accompanied by adaptation efforts in teams can optimally support reliability and interaction in interprofessional collaboration teams, as depicted in factor 3. These three factors continuously lead to the identity triad (personal identity, professional identity and interprofessional identity) needed for successful interprofessional collaboration.

These findings highlight additional points that must be considered in the development of the literature regarding the concept of self-reflection for IPE, which was originally limited to the three layers of IPE self-reflection (personal, professional and interprofessional) (31); now, the three factors mentioned above should also be considered. The development of a student self-reflection questionnaire instrument for IPE also provides added value and novelty to the existing IPE self-reflection instrument through the self-reflection writing developed by Zarezadeh et al. (31), as well as other existing work included in the scoping review. Three layers of reflection (personal, professional, and interprofessional) must be carried out at every stage, starting from self-awareness and team development, so that openness/readiness and adaptation efforts in interprofessional collaborative teams can be achieved, ultimately supporting an individual's reliability and interaction within an interprofessional collaborative team.

The grouping of questionnaire items resulting from the EFA demonstrates that a layered self-reflection in personal, professional and interprofessional domains is required in factors 1 and 3, whereas factor 2 only includes professional and interprofessional reflection without involving personal reflection. The EFA results also show that factor 1 involves more personal reflection (11 items) than professional reflection (4 items) and interprofessional reflection (7 items); factor 2 involves more interprofessional reflection (13 items) than professional reflection (1 item) and does not involve personal reflection (0 items); and factor 3 involves more interprofessional reflection (10 items) than professional reflection (3 items) and personal reflection (1 item). Overall, the interprofessional reflection section was larger (30 items) than the professional reflection (8 items) and personal reflection (12 items) sections. This finding aligns with the IPE self-reflection writing guide instrument of Zarezadeh et al., in which interprofessional reflection contained the most items (14 items), followed by personal reflection (13 items) and professional reflection (8 items) (31).

Reflection, which involves the ability to think critically, solve problems and appropriately adapt to situations as a form of development of the intrapersonal and interpersonal dimensions (32), is crucial for graduates of medical and health science programmes in developing professionalism (58) and triad identity; therefore, the ability to reflect is a collaborative competency that must be trained, taught and assessed in IPE. The development of self-reflection assessment instruments is needed to support collaborative learning and assess students' competence to self-reflect in IPE. This research developed and validated a self-administered questionnaire for students' self-reflection in IPE; this questionnaire is the first to focus on assessing self-reflection in the context of IPE in a holistic and comprehensive manner covering personal, professional and interprofessional aspects. The division of IPE self-reflection into personal, professional and interprofessional aspects describes the aspects that must be reflected on during IPE; therefore, it greatly facilitates IPE self-reflection. A holistic and comprehensive reflection aims to improve personal, professional and interprofessional aspects, thus supporting transformative learning to increase collaboration competence and the process of internalising the positive values of interprofessional collaboration, which results in strengthening personal, professional and interprofessional identity. The assessment of IPE self-reflection abilities in those three aspects is needed as feedback for individuals to take corrective steps and development in one, two, or all three aspects (personal, professional and interprofessional) of IPE self-reflection to produce the triad identity (personal, professional and interprofessional identity) required for successful collaboration. Our findings contribute to closing the existing gap in the literature regarding reflection for the development of personal, professional and interprofessional identity.

The items in the RESPECT questionnaire are in line with other existing IPE/IPCP questionnaires but have more holistic subdomains in the personal, professional and interprofessional aspects so that the development of the RESPECT instrument complements the shortcomings of existing instruments (Zarezadeh, Interdisciplinary Education Perception Scale-IEPS, Interprofessional Collaborative Competencies Attainment-ICCAS, The Chiba Interprofessional Competency Scale-CICS 29, and Collaborative Practice Assessment Tool-CPAT) and updates them according to recent developments in interprofessional collaboration (59–63). For example, subdomains that are not included in the previously existing IPE/IPCP instruments include tolerance, courage to face challenges, admitting mistakes and apologising, interprofessional ethics (interprofessional reflection), professional ethics (professional reflection) and activeness, empathy and personal discipline (personal reflection).

The development of an instrument assessing students' self-reflection abilities in IPE has a large impact on medical education because of its potential to be applied directly in IPE as a tool to facilitate the development of students' self-reflection abilities. The subdomains and items in the IPE self-reflection questionnaire could help students understand and systematically implement their IPE self-reflection in the form of reflective writing and reflective dialogue. Not only is the instrument able to guide students in carrying out self-reflection in IPE, but it can also help supervisors discuss self-reflection skills with their students. Reflective dialogue between supervisors and students can employ the subdomains contained in the questionnaire as a basis for exploring personal, professional and interprofessional aspects, focusing on factors that have already been reflected upon and those that still require reflection. Students can also develop reflective writing and dialogue using the subdomains contained in the self-reflection questionnaire in IPE. This instrument can be used to assess students' self-reflection abilities in the IPE context and provide feedback for institutions and students regarding progress or changes in students' self-reflection abilities. The use of this

instrument for assessment could also potentially trigger an increase in students' learning motivation, and support an appropriate atmosphere for interprofessional collaboration to produce health workers who are ready to collaborate in IPCP.

Although the questionnaire was distributed to undergraduate medical and health students to evaluate reflective competencies, we feel that this tool can be easily adapted for use in any discipline and student population as well as for use in the clinical rotation stage, as the focus of the tool is on reflection in IPE. The generalisability of the results may be limited because the sample was restricted to a group of students at a single university in Indonesia. However, the comprehensiveness of the analyses and the multiple phases of the study provide a basis for further validation and use of this instrument. Although bias may arise because of the self-rating nature of the questionnaire, we focused on how the instrument's items express the domains and subdomains of the reflective practice in IPE. Further validation studies are warranted, specifically to examine the relationship of the instrument and its subscales with students' triad identity and other measures of their learning in IPE courses.

CONCLUSION

The RESPECT questionnaire is a valid and reliable instrument that can be used to evaluate students' self-reflection in IPE. The evidence for validity and reliability of the IPE self-reflection measurement using the questionnaire were strongly supported by multiple evidence obtained from a robust and meticulous process. This IPE self-reflection questionnaire explores students' self-reflection in personal, professional and interprofessional aspects. Students' holistic and comprehensive IPE self-reflection abilities in these three aspects are expected to support the formation of their professional and interprofessional identities, which are necessary for successful interprofessional collaboration.

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ETHICAL APPROVAL

This study was approved by the Research Ethics Committee, Faculty of Medicine, Universitas Indonesia (KET-394/UN2.F1/ETIK/PPM.00.02/2023). The aim and process of the research were explained to participants. The participants provided their written informed consent to participate in this study.

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