Journal of Public Health and Pharmacy
2775-4952 (Online - Elektronik)
Research Articles Open Access

Preparing a Collaborative Health Workforce through Team-Building Training: A Pilot Reaction-Level Evaluation in Indonesia

Irwin Irwin[1,2*], Gandes Retno Rahayu[3], Yoyo Suhoyo[3]
[1]Department of Medical Education, Faculty of Medicine, Universitas Hasanuddin, Makassar, Indonesia
[2]Doctoral Program in Health and Medicine, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia
[3]Department of Medical Education, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

***Corresponding Author**: E-mail: irwinaras@unhas.ac.id

ARTICLE INFO

Manuscript Received: 14 Jul, 2025
Revised: 09 Dec, 2025
Accepted: 23 Jan, 2026
Date of publication: 01 Jul, 2026
Volume: 6
Issue: 2
DOI: 10.56338/jphp.v6i1.8075

KEYWORDS

Interprofessional Education;
Team Building;
Health Workforce;
Instructional Design;
Collaboration

ABSTRACT

Introduction: Global health systems face challenges from fragmented services, high costs, and workforce shortages, impacting care quality. Interprofessional education (IPE) is a key strategy for preparing a collaborative workforce. According to ADDIE instructional design model, this study aimed to develop and implement a policy-relevant team-building training program to enhance collaboration, communication, and problem-solving skills among health professional students, supporting health system transformation goals.

Methods: The program was developed through the five phases of the ADDIE model—Analysis, Design, Development, Implementation, and Evaluation. A needs assessment guided the design of interactive, experiential activities to improve teamwork competencies in interprofessional education. The training program was piloted for 16 hours (two separate days) with health professional students from diverse disciplines (N=11). A mixed-methods approach was implemented, while the quantitative data were collected via the reaction level of the adjusted Kirkpatrick-Phillips' questionnaire to assess satisfaction scores, and qualitative data were collected through focus group discussions (FGDs).

Results: The implementation of the team-building program significantly improved participants' teamwork skills, communication effectiveness, and overall group cohesion. Participants reported highly positive participant reactions and perceived teamwork enhancement.

Conclusion: Applying the ADDIE model to structure team-building activities provides an effective educational strategy to foster interprofessional collaboration early in training. More importantly, such structured interventions represent a strategic investment in human resources for health, contributing to policy objectives for integrated and team-based care delivery.

Publisher: Pusat Pengembangan Teknologi Informasi dan Jurnal Universitas Muhammadiyah Palu

INTRODUCTION

Current global health systems are challenged by fragmented services, which contribute to high costs, workforce shortages across service lines, and compromised quality of care (1). Effective, efficient health service delivery requires collaborative practice among health workers (2). Interprofessional collaboration (IPC) is a partnership model based on mutual respect and teamwork, aiming to improve health services and solve problems in concert with patients, families, communities, and other stakeholders (3). A primary strategy for preparing future health workers for collaborative practice is interprofessional education (IPE) (4), as IPE and IPC are interdependent components essential for high-quality healthcare (5).

Teamwork is a core IPE competency, and an effective team-building process is foundational to achieving shared goals (6). Team-building concepts practiced within IPE can improve understanding and attitudes toward interprofessional cooperation (7). Effective team-building activities incorporate communication, mutual recognition of skills, joint tasks, and problem-solving (8). Developing a structured team-building program requires systematic steps to clarify goals, roles, interpersonal relationships, and problem-solving approaches (9).

The ADDIE model—encompassing Analysis, Design, Development, Implementation, and Evaluation—is an established paradigm for developing educational resources (10). The effectiveness and feasibility of this approach have been proven by several studies on health workers (11). This study aimed to conduct a developmental feasibility study of a team-building training program for IPE in health professions using the ADDIE approach. Improving interprofessional teamwork through pre-service education is not only a pedagogical concern but also a strategic health workforce issue. As emphasized by the World Health Organization (WHO) (1), digital collaborative IPE practice, simulation-based collaboration, and validated teamwork metrics are essential to meet the demands of universal health coverage and people-centered care (12-14).

METHOD

This research was carried out at Hasanuddin University in Indonesia and has received ethical approval from the Health Research Ethics Committee of Hasanuddin University (Code: 72/UN4.6.4.5.31/PP36/2022). Informed consent was obtained via digital forms. All data collected was securely stored on a password-protected computer located within the Department of Medical Education, with access limited strictly to the research team. The study applied the ADDIE model, which encompasses the stages of analysis, design, development, implementation, and evaluation. This systematic framework was utilized to create effective educational products, continuously refining them at each stage (15).

Analysis Stage

This stage identified learner's need to define learning objectives. A qualitative needs assessment was conducted via focus group discussions (FGDs) with health workers from hospitals, public health centers (*Puskesmas*), and clinics in Makassar. Participants were purposively selected to represent various professions, with inclusion criteria requiring at least three years of practice and provision of informed consent.

FGDs, lasting up to 90 minutes and conducted in Indonesian, were moderated by researchers with backgrounds in social psychology using a pre-tested guide. Sessions were audio-recorded with written permission. Moderators and note-takers discussed summaries with participants to ensure data credibility. Furthermore, all data handling and transcription procedures adhered to strict confidentiality protocols. To ensure participant anonymity, all collected data were transcribed into a secure, encrypted database where all personally identifiable information (PII) was replaced with unique, non-sequential study codes immediately upon receipt.

Thematic analysis was performed to identify patterns and generate themes of the analyzed data (16). These themes were then contextualized and compared with existing literature (17). In this study, four key principles of data validity were implemented: credibility, transferability, dependability, and confirmability. To establish data credibility, a combination of theory and researcher triangulation was utilized. The researcher incorporated insights from two distinct sources regarding the factors influencing interprofessional collaboration (18-19). Additionally, consultation with experts in social psychology was conducted to refine the FGD questions. Researcher triangulation was further employed, involving collaboration with other researchers from the fields of social psychology and medical education throughout the data collection and analysis phases. A comprehensive description of the research process, detailing each phase from preparation to data analysis, was conducted to heightened transferability process. To ensure

dependability, observation notes recorded during the data collection were scrutinized, and transcription results were thoroughly reviewed by both participants and the researchers. Confirmability was attained by validating the research findings with other researchers and supervisors, thereby minimizing the risk of bias and subjectivity in the researcher's interpretation.

Design Stage

Based on the analysis, instructional strategies were designed using an experiential learning approach (20), chosen for its effectiveness in engaging cognitive and affective domains (21). The design specified learning materials, methods, implementation stages, resources, and timelines.

Development Stage

A prototype IPE team-building intervention module was developed. Its validity was assessed by three experts in social psychology (Expert 1), group development (Expert 2), and general psychology (Expert 3). Together with medical education experts, they evaluated the module's alignment with objectives, content, activities, methods, and media.

Implementation Stage

The validated module was piloted with students from diverse health professional programs to evaluate its applicability under controlled conditions. The session was facilitated by two lecturers.

Evaluation Stage

A reaction-level evaluation was conducted immediately post-implementation immediately using a tool adapted from Phillips and Stone (22), assessing training materials, methods, facilitator performance, and overall impressions. A mixed-methods convergent parallel design was employed (23). Participant satisfaction scores were obtained through a questionnaire modified from the Kirkpatrick–Phillips Training Evaluation Model at the reaction level. This instrument encompasses three dimensions: Training Content, Activities and Materials, and Facilitator, each assessed through specific indicators (e.g., clarity and relevance of content, effectiveness of learning activities, and quality of facilitation). Responses were evaluated using a five-point Likert scale, with ratings ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Higher scores indicate a more favorable response. The instrument's validity and reliability were established through two previous studies that conducted psychometric evaluations. The research conducted by Kartowagiran & Desi demonstrated robust content validity through expert assessment, yielding an Aiken's V coefficient greater than 0.70 and high internal reliability (Cronbach's $\alpha = 0.844$) (24). Additionally, findings by Azmy & Setiarini indicated consistent results, with item-total correlation values exceeding the r-table (0.361) and reliability surpassing the acceptable threshold ($\alpha > 0.70$) (25). This consistent evidence affirms that the instrument utilized in this study possesses sufficient content and construct validity, as well as high internal reliability. Qualitative data were also gathered via FGDs with pilot participants.

RESULTS

Analysis Stage

FGDs included 15 informants from diverse professional backgrounds, predominantly female. Work settings were nearly evenly split between hospitals and *puskesmas* (Table 1). The analysis, grounded in the principles of positive psychology (26, 27), revealed several significant personal barriers to collaboration: seniority, negative self-perception, ego, professional arrogance, ineffective communication, undefined competency boundaries, and insufficient experience. These barriers were transformed into constructive learning objectives focused on developing humility, empathy, effective communication, and collaboration. Additionally, self-awareness was incorporated as a foundational competency, drawing on Goleman's research (28). As a result, the program aimed to enhance self-esteem, humility, empathy, effective communication, collaboration, and self-awareness.

Table 1. Participant characteristics in the analysis stage (N=15)

Variable	Sub-group	Amount	
		n	%
Gender	Male	2	13.3
	Female	13	86.7
Health profession	Medical doctor	4	26.7
	Dentist	3	20.0
	Nurse	2	13.3
	Midwife	2	13.3
	Pharmacist	1	6.7
	Nutritionist	1	6.7
	Physiotherapist	1	6.7
	Surveillance officer	1	6.7
Workplace	Hospital	7	46.7
	Public health center	7	46.7
	Clinic	1	6.7

Design Stage

Six specific learning objectives were derived, each linked to relevant theories and experiential methods (Table 2). The intervention model prototype reveals a thoughtfully structured journey from inner awareness to outward collaboration. It begins with introspective activities, such as "Draw Myself," to build a foundation of self-awareness, and then gradually progresses through experiential exercises, including "Mirror Games" and role-playing, to cultivate empathy and assertive communication. This qualitative design embodies a deliberate pedagogical philosophy that employs interactive, theory-grounded methods to transform abstract psychological concepts into tangible interpersonal skills for future healthcare teams.

Table 2. Design of the interprofessional team-building intervention prototype

No.	Specific Objectives	Materials or theories used	Methods used	Activity Name
1	Improve skills in self-awareness.	Self-Awareness (28)	Self-report and reflection	- Draw My Self - Who am I?
2	Enhance the ability to respect oneself.	Self-worth (26)	Games, roleplay, and interactive lecture	- I am valuable, we are valuable - Self-worth
3	Improving the ability to be humble.	Humility (26)	Self-report and reflection	- Correct me if I am wrong
4	Improve the ability to empathize with others.	Empathy (28)	Games, self-report, roleplay, and interactive lecture	- Guess the emotion - Mirror Games - Sympathy vs Empathy
5	Enhance the ability to communicate effectively with others	Effective Communication & Assertive Communication (28)	Games, roleplay, and interactive lecture	- Draw it - Assertive Communication - Role Play Assertively and Empathically
6	Increase knowledge of collaboration	Collaboration (28)	Brainstorming, interactive lecture	- Hello Future - How to Collaborate

Development Stage

Expert validation confirmed the prototype's appropriateness, suggesting minor revisions to enhance quality, such as clarifying objectives, simplifying terminology, refining activity instructions, and improving facilitator materials (Table 3). A finalized module was prepared for piloting (Table 4).

Table 3. Module revisions following expert judgment

Component	Revision	Data Sources	Revision Decision
Objective s	Develop specific objectives linked to both cognitive and affective domains.	Expert 3	Developing specific objectives that link both cognitive and affective domains.
Material	Changing some terms into more general terms or terms that are easier for laypeople to understand.	Expert 1 and 3	Changing some terms to more general or more easily understood terms for laypeople.
Activity	Including relaxation and flashback activities.	Expert 3	Including relaxation and flashback activities.
Method	Changing the description of the *Guess the Emotion* activity.	Expert 2 and 3	Changing the description of the Guess the Emotion activity.
Media	Preparing an abstract image for the draw-it activity.	Expert 2	Preparing abstract images for the Draw It activity.
Module Facilitator	Organizing the material in the facilitator module in more detail.	Expert 1 and 3	Developing more detailed material in the facilitator module.
Workbook	Re-editing the workbook following expert feedback.	Expert 2	Re-editing the workbook to reflect expert input.

Table 4. Structure of the interprofessional team-building intervention

General Objectives	Duration (minutes)	Method	Media
1. Promote self-awareness and cultivate humility	80	Experiential learning, self-report, reflection	Stationery, Sound system, Flipchart
2. Enhance empathy with others	60		Stationery, LCD projector.
3. Promote effective communication skills	100	Games, roleplay, interactive lecture	Stationery
4. Increase self-appreciation	20		Stationery
5. Improve collaboration knowledge	40	Brainstorming, Interactive Lecture	Stationery

Implementation Stage

The module was conducted as a pilot study involving 11 participants from various healthcare disciplines, including medicine, dentistry, nursing, physiotherapy, public health, nutrition, veterinary medicine, pharmacy, and psychology. Two facilitators conducted the two-day training program at the Faculty of Medicine, Universitas Hasanuddin.

Evaluation Stage

Feedback from questionnaires and FGDs was positive. Reaction-level evaluation data (Table 5) showed high suitability ratings (>90% "Suitable" or "Very Suitable") across all components: content, activities/materials, and facilitator performance.

Table 5. Participant evaluation of the team-building intervention (N=11)

Component of evaluation	Rating Score									
	Very Unsuitable		Unsuitable		Neutral		Suitable		Very Suitable	
	n	%	n	%	n	%	n	%	n	%
Training content										
Clear objectives	0	0	0	0	1	9	4	36	6	55
Easy to understand	0	0	0	0	0	0	6	55	5	45
Related to objectives	0	0	0	0	1	9	6	55	4	36

Relevant to everyday life	0	0	0	0	0	0	7	64	4	36
Activities and materials										
Worksheet	0	0	0	0	0	0	6	55	5	45
Audiovisual	0	0	0	0	0	0	6	55	5	45
Sharing insight	0	0	0	0	0	0	5	45	6	55
Discussion	0	0	0	0	0	0	6	55	5	45
Role Play	0	0	0	0	0	0	7	64	4	36
Games	0	0	0	0	0	0	5	45	6	55
Bridging	0	0	0	0	0	0	6	55	5	45
Facilitators										
Knowledgeable	0	0	0	0	0	0	3	27	8	73
Explain clearly	0	0	0	0	0	0	3	27	8	73
Creative	0	0	0	0	0	0	3	27	8	73
Managing well	0	0	0	0	0	0	3	27	8	73

Theme 1: Training Content

Regarding the materials used, participants indicated that the content aligned well with the intervention model's objectives. They expressed that the training materials were relevant to the intended goals and applicable to their daily lives. Furthermore, participants reported gaining valuable insights after completing the training session.

> *"The training has gone well, the material has been delivered very well and is easy to digest and understand, there are also fun games, and I have gained experience and also valuable lessons"* (S6, Medicine)

Although the materials have been effectively delivered to the participants, several components require further refinement. For instance, the instructions for the "draw it" activity need a more comprehensive explanation to enhance participants' understanding.

> *"...the material is fun so I know myself and others. The material also fits the objectives. But I got it wrong in the draw it activity"* (S2, Veterinary)

Theme 2: Activities and Materials

Participants reported that the activities and materials were effective in enhancing understanding of the content, particularly among adolescents and young adults. The evaluation focused on how well the activities aligned with the subject matter and the characteristics of the respondents. Several participants noted:

> *"The components are good so that the activities are not boring. But hopefully it can still be developed so that it can be even better"* (S4, Dentistry)

> *"The media used is very helpful and varied so that participants are not too bored in participating in the event, even though the duration is fairly long"* (S9, Public Health)

To enhance the efficacy of the role-play method, researchers should implement a more structured time limit. This point was emphasized by one of the participants:

> *"I am very happy to participate in this training because it turned out to be fun, and there were many games. In the future, the thing that might be improved is the time management of the implementation of this activity, especially in the role play part, which takes up a lot of time"* (S6, Medicine)

Theme 3: Facilitator

Regarding the facilitator, all participants acknowledged that they demonstrated a strong command of the subject matter. The facilitator was deemed effective in clearly articulating the content, fostering discussion, and ensuring activities remained aligned with the training objectives.

This perspective was further supported by qualitative data obtained during FGDs, as expressed by several participants:

> *"Very good at mastering the material and very good at presenting the material"* (S2, Psychology)

> *"The interactive discussion and the insertion of jokes helped us stay enthusiastic in receiving the material and undergoing this activity well."* (S10, Pharmacy)

In this context, facilitators have been trained through specialized modules designed to enhance their understanding and implementation of activities aligned with the training objectives.

Theme 4: Intervention Training's Effectiveness

Participants evaluated the effectiveness of the interprofessional team-building intervention training on a scale of 1 to 10, with 1 indicating low effectiveness and 10 indicating high effectiveness. This evaluation considered the content, activities, equipment, and facilitators. The median score for overall training implementation and effectiveness was 10 (range 8-10; interquartile range 1), with a mean of 9.45 ± 0.687. Based on the established threshold of ≥8, deemed very suitable, these results indicate that the intervention was highly effective in fostering interprofessional team building. Moreover, participants reported noticeable changes in their attitudes and perspectives towards diverse groups and varying professional backgrounds following the training. Several participants articulated their experiences as follows:

> *"The training has gone well, the material has been delivered very well and is easy to digest and understand, there are also fun games between the material, and I have gained experience and valuable lessons"* (S6, Medicine)

> *"Closer and a little more open with friends"* (S1, Physiotherapy)

> *"Knowing more about my shortcomings so that I am more aware of improving myself again"* (S7, Nutrition).

DISCUSSION

Instructional design is pivotal for creating effective learning experiences. The choice of model significantly influences the achievement of learning objectives. While models like Morrison, Ross, and Kemp (MRK) offer non-linear flexibility (29) and Dick and Carey provide a highly structured, linear framework (29,30), the ADDIE model was selected for this study. ADDIE's phased, systematic yet flexible structure allows for iterative revision and has proven effective in creating interactive media that meet learning objectives (30,31). This aligns with our participants' agreement that the training content and methods were suitable for the team-building objectives.

Team building, defined by WHO as assembling and enabling a group to work toward a common goal (1), aims to enhance long-term team effectiveness (32). It improves productivity, interpersonal relationships, social skills, and adaptive capacity (33). Our findings indicate the intervention positively shifted students' perceptions of interprofessional differences, enhanced team cohesion, and fostered openness. Collaborative interaction helps individuals understand teammates' styles, identify team dynamics, and recognize the impact of their behavior (34). Team building also boosts self-confidence, encouraging the contribution of ideas (35).

In healthcare, effective communication is critical for patient safety and for bridging professional divides (36). Empathy, a skill exercised through the intervention's games, is equally vital for effective teamwork, improving responsiveness to colleagues' needs (37,38). The team-building training developed here is an investment in improving teamwork quality, which subsequently enhances service quality. It helps future professionals develop essential collaborative skills.

Team building during training, as outlined in this study, represents a vital investment aimed at enhancing teamwork quality among members, which subsequently can lead to improved health service delivery. This initiative is designed to help aspiring healthcare professionals cultivate robust collaborative skills essential for their future practice. Furthermore, the implementation of interprofessional team-building interventions among health professional students holds significant implications for policies related to health workforce development. Incorporating such training into undergraduate health curricula fosters a workforce ready for collaboration, which is essential to enhancing quality, safety, and efficiency in healthcare systems. Specifically, the focus on effective communication, empathy, and humility directly addresses the core competencies for collaborative practice outlined by the WHO's IPE framework, ensuring that trainees are well-prepared for team-based care delivery. At the national level, although the Ministry of Health's strategic plan document for 2022-2029 does not explicitly mention the role of IPE and IPC, this model serves as a strategic human resource approach that can be referenced in the development of the previously established IPE implementation guidebook (39-41). At the policy level, investing in early interprofessional education serves as a proactive human resource strategy to address care fragmentation and workforce shortages (40).

This model for interprofessional team-building interventions has the potential to significantly enhance the efficacy of collaborative healthcare teams when systematically implemented at both institutional and policy levels. The relevance of this implementation is underscored by national regulatory frameworks that endorse it, though achieving uniform application remains a significant challenge. In terms of curriculum adherence and accreditation, this Module helps align with the nationally stipulated curriculum requirements. The Indonesian Physician Competency Standards (SKDI) explicitly require the incorporation of interprofessional relationships, communication, and collaboration within medical education curricula (42). Additionally, the Indonesian National Qualifications Framework (KKNI) identifies the capacity to address multi-professional issues as a critical Graduate Learning Outcome (CPL) for higher education (43). The Health College Accreditation Standards also mandate the integration of Interprofessional Education (IPE) within the curriculum (44).

To effectively enhance faculty competencies, the successful execution of IPE necessitates faculty members who possess not only expert knowledge in their respective disciplines but also the ability to facilitate interprofessional learning (1). Moreover, the sustainable implementation of IPE requires robust policy support from the highest levels of government. A formal collaboration between the Ministry of Health, which plays a crucial role as the primary user of graduates and regulator of the healthcare system, and the Ministry of Education, Culture, Research, and Technology, which oversees higher education regulation, is essential to facilitate Primary Care Transformation that emphasizes the importance of strong teamwork (41).

The present study had the main limitations regarding the scope of intervention. Teambuilding intervention in this study is at the micro level or individual level, from 3 levels of factors that play a role in collaboration between health workers. The teambuilding intervention is included as part of the educational-based intervention, with one of its goals being to develop students' teamwork skills. Recognizing that this research intervention focuses specifically on one micro-level factor—health profession students—it is essential to acknowledge that multiple elements contribute to fostering interprofessional collaborative practice in healthcare settings. In addition, the limited number of participants has not been able to provide a complete picture of the success of the teambuilding intervention using the ADDIE approach, despite the variety of study program backgrounds. Extracting information related to the effectiveness of the program is limited by the number of participants. To enhance the generalizability and validity of future research, it is essential to address limitations related to sample size, follow-up duration, and reliance on subjective data in subsequent controlled, pre-post, or mixed-longitudinal design studies.

CONCLUSION

Using the ADDIE model to develop team-building training for multi-professional health students provides valuable experiential learning and prepares them for future collaborative practice. Future research should involve larger cohorts and explore additional factors that strengthen IPC. From a policy perspective, this model can be a strategic component in reforming health workforce education, aligning pre-service training with system needs. Embedding interprofessional team-building in national curricula supports policies aimed at better care coordination, cost-efficiency, and improved health outcomes, particularly in community-based settings.

AUTHOR'S CONTRIBUTION STATEMENT

Irwin – conceived and designed the analysis, collected the data and wrote the original draft, data analysis and reviewed the manuscript.

Gandes Retno Rahayu – conceived and designed the analysis, reviewed and ascertained the quality of the manuscript, reviewed and validated the manuscript.

Yoyo Suhoyo – conceived and designed the analysis, reviewed and ascertained the quality of the manuscript, reviewed and validated the manuscript.

All authors read and approved the final version of the manuscript

CONFLICTS OF INTEREST

The authors declare that there are no competing interests related to the study.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

Grammarly contributed to this text by responding to these AI prompts: "rephrase them with maintain their clear, concise, and scientifically sound for medical professional in the context of abstract/introduction/methods/results/discussion's section of high quartile international journal"

SOURCE OF FUNDING STATEMENTS

Nothing to declare.

ACKNOWLEDGMENTS

The authors acknowledge to academic staff of Medical Education Department and Psychology Department at the Faculty of Medicine Universitas Hasanuddin, who have assisted in providing intervention, data acquisition, and monitoring variables. Moreover, the authors acknowledge Farhamna Academic for assisting in preparing this manuscript.

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