Advances in Medical Education and Practice

Dovepress
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ORIGINAL RESEARCH

Enhancing Team Competencies in Medical Education: Conceptualization and Implementation of a Teaching Unit for German Medical Students

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Introduction: The quality of interprofessional collaboration significantly impacts the efficiency and effectiveness of healthcare, making it increasingly important in medical education. Strengthening team culture should be integrated into the medical curriculum as early as possible to lay the foundation for successful interprofessional collaboration.

Teaching Project: At the University Medical Center Magdeburg (UMMD), a course titled "Team Competencies – Professional Collaboration in Medicine" was developed and implemented for third-year medical students. The course comprises two lectures and one seminar. The seminar focuses on firsthand experiences, conveyed through simulated interprofessional situations, including structured feedback sessions.

Results: A total of 20 courses were conducted with 197 medical students. Attendance at the two lectures was optional, while the seminar was mandatory. The teaching concept demonstrated its practicality by using role-plays to create realistic learning experiences, further enhanced by the crucial element of differentiated and structured feedback. Self- and peer-reflective exercises promoted openness and communication skills in interprofessional contexts, as well as fundamental competencies in interprofessional collaboration.

Discussion and Conclusion: Following the initial implementation phase of the new course, a further development phase is planned. This includes the introduction of an online self-learning module and the implementation of video feedback to intensify self-reflection. Additionally, there are plans to integrate this course with other modules and to establish a longitudinal approach to the overarching competency of interprofessionalism, as outlined in the NKLM 2.0. This will provide students with multiple opportunities to engage with interprofessionalism throughout their education, fostering the development of respectful and appreciative attitudes toward other healthcare professions.

Keywords: interprofessional, feedback, role-play, curriculum

Introduction

The effective and efficient treatment of patients requires close collaboration among various disciplines and professions. This significantly influences the quality of healthcare delivery.[1] Interprofessional collaboration (IPC) facilitates access to healthcare services, optimizes resource utilization, reduces errors, complications, and overdiagnosis, and enhances the quality of life for individuals with chronic conditions. At the same time, interprofessional practice (IP) fosters team conflict resolution and helps retain skilled personnel.[2,3] Given the demographic changes, including an aging population, a decline in healthcare professionals, and increasing cultural diversity, the concept of IP in medicine has become increasingly important.[4] In 2010, the WHO developed strategies to strengthen IPC in practice and education.[3]

In response to these challenges, various health policy measures have been introduced over recent decades to strengthen IPC in both training and continuing education in Germany. Several projects have focused on integrating interprofessional education into the curriculum, promoting a more collaborative approach to healthcare training across

Received: 22 January 2025
Accepted: 21 May 2025
Published: 14 June 2025

disciplines.[5] A significant development in this regard was the inclusion of IPC as one of seven core competencies in the National Competency-Based Learning Objective Catalog for Medicine (NKLM 2.0). This inclusion is to be implemented longitudinally and across disciplines within German medical curricula.[6] The Interprofessional Education Collaborative (IPEC) framework, regarded as the gold standard for developing IP educational units, defines four core areas: values and ethics, communication, roles and responsibilities, and teamwork.[7,8] These domains guide the design of structured interprofessional learning and highlight the importance of collaborative competencies.[7] Accordingly, the teaching unit in question was designed with a strong focus on these core areas to ensure a competency-oriented approach.[7]

The growing emphasis on the effectiveness of interprofessional education (IPE) in recent literature underscores the urgent need for its systematic implementation and evaluation. Scoping reviews by Cadet et al (2023) and Jiang et al (2024) highlight that IPE leads to significant improvements in various aspects of patient care, such as reducing medical errors, improving patient education, and decreasing hospital stays.[9,10] Additionally, Saragih et al (2024) further demonstrate that interprofessional learning modules are crucial for enhancing attitudes and fostering mutual respect among healthcare professionals.[11]

Teaching these competencies requires structured didactic approaches that vary in their clinical depth and should be integrated into the medical curriculum early on.[6–8] Key methods include team-based, simulation-based, and problem-based learning.[12–14] Simulation-based scenarios, in particular, have proven effective in training IPC, communication, and conflict management skills.[12,15,16] Moreover, cultivating a culture of feedback—particularly through constructive, specific feedback and debriefing—has shown positive effects on learning experiences.[17–19] Challenges arise in separating communication issues from personal factors.[20] In this regard, video- and peer-feedback, guided by instructors, has been shown to support self-reflection.[18,21] Self-reflection, a key competency for lifelong learning,[19] is essential in effective IP communication.[22] Being able to reflect on team roles enhances the understanding of one's own role and, consequently, team dynamics, contributing to conflict prevention.[23,24]

The FINCA concept provides a framework for systematically promoting IPC. It focuses on collaborative activities and defines contextual, personal, process, and outcome-related factors, providing a foundation for evaluation.[16] The evaluation of IP education has become an integral part of curriculum development. It includes self-assessments and multimodal methods that address cognitive, affective, and behavioral aspects.[25] For example, the Simulation-Based Interprofessional Teamwork Assessment Tool is used to evaluate individual and team performance of students in simulation-based IP scenarios.[26]

The implementation of IP educational units aims to reduce role ambiguity, address hierarchical issues, and overcome communication barriers.[22,27] Overall, IP education has been shown to enhance IP competencies through a variety of teaching methods.[7] Integrating these didactic concepts is essential for equipping students to tackle the challenges of healthcare delivery.

Building on this foundation, a new educational unit was developed at the University Medical Center Magdeburg (UMMD). This study focuses on the following aspects:

1. Conceptualization – content and didactics.
2. Initial implementation.
3. Professional reflection and further development.

Description of the Teaching Unit

The flowchart (Figure 1) illustrates the general approach to implementing the teaching unit.

Integration into the Existing Curriculum

The teaching unit was designed for the first clinical year and consists of a total of six modules. As the unit is based on the biopsychosocial approach, it is part of the Department of Psychosomatic Medicine and Psychotherapy. And since the biopsychosocial approach to health and disease requires the involvement of various healthcare professions, this integration ensures its implementation. The approach facilitates not only the theoretical transfer of knowledge but also diverse practical experiences in IPC as well as team competencies. During the implementation phase, no separate examination was conducted, apart from active participation in the seminar.

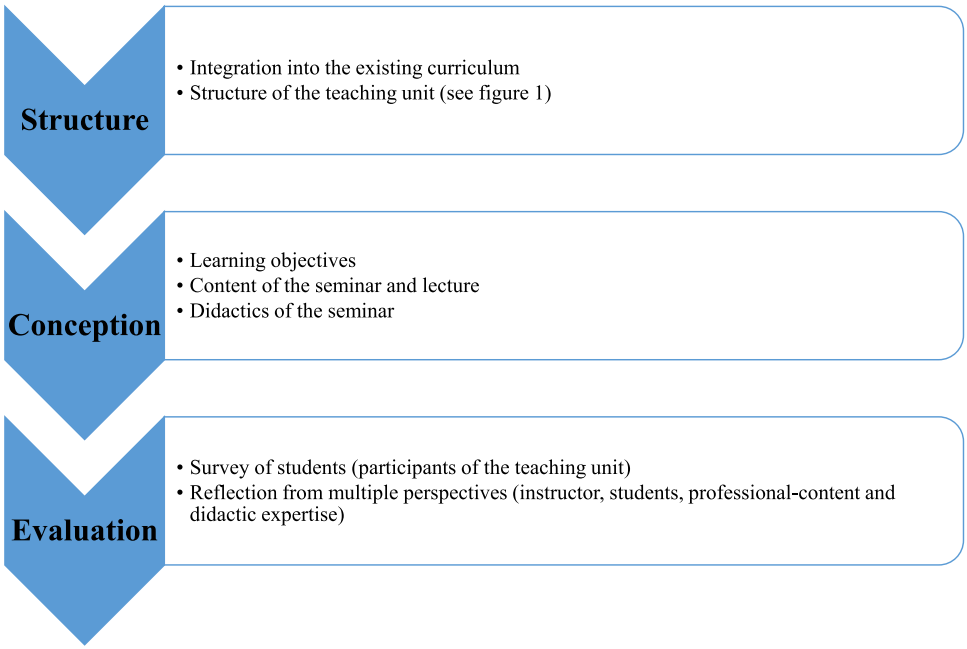

Figure 1 Flowchart of the methodological approach.

Structure of the Teaching Unit

The teaching unit consists of both a lecture and a seminar component (Figure 2). A 90-minute introductory lecture presents the topic, provides evidence-based knowledge on interprofessionalism, and prepares students for the subsequent small-group seminar. The seminar focuses on experiential learning through realistic simulated scenarios, with structured feedback to encourage reflection on these experiences. The concluding 45-minute lecture focuses on error management and how mistakes are addressed in the hospital setting, with particular emphasis on fostering a constructive approach to errors. For this in-depth session, students select one of three topics provided during the introductory lecture.

Seminar schedule template	**3 x 45 min**
Introduction, Organization, and Schedule of the Seminar	
Self-Reflective Exercise: Belbin Team Roles	
Feedback – Reminder / Preparation / Procedure for simulation based scenarios	
Simulation based scenario 1 – SBAR-Framework	
Preperation of simulation based scenario 2: Interprofessional ward round	
Simulation based scenario 2 – Interprofessional ward round	
Summary & Evaluation	

Figure 2 Overview of the teaching unit.

https://doi.org/10.2147/AMEP.S516776

Learning Objectives of the Teaching Unit

The overarching goal of this teaching unit is to enhance the interprofessional competencies (IPC) of medical students as outlined in the National Competency-Based Learning Objective Catalog for Medicine (NKLM 2.0). These competencies are outlined in Section VIII: Overarching Competencies, Point 3: IP Competencies.[6]

By the end of the teaching unit, participants will:

- Recognize the value of (inter-)professional collaboration in healthcare and be encouraged to cultivate a respectful and appreciative attitude toward patients and colleagues through active engagement.
- Understand the importance of professional collaboration and become familiar with key terms, theories, and models related to interprofessional teamwork.
- Gain insights into the principles of constructive error culture, which are emphasized throughout the unit.
- Develop self- and peer-reflective skills essential for building an IP mindset.

The seminar focuses on developing Level 3a action competence (the ability to act in complex situations), while the lectures primarily address factual knowledge and justificatory reasoning. This structured approach ensures both a solid theoretical understanding and practical application of interprofessional principles.

Content and Didactics of the Seminar

The seminar offers a valuable opportunity to gain hands-on experience in IPC within a supportive environment, emphasizing perspective-taking through practical exercises (Figure 3). At the start of the seminar, participants are welcomed, introduced to one another, and given an overview of the seminar structure. This establishes a transparent and open foundation for collaborative work.

The first exercise focuses primarily on self-reflection, utilizing Belbin's team roles model,[24] which is introduced during the opening lecture. The nine team roles are initially presented by the students in a plenary session, using distributed templates to provide a foundational understanding of each role. Students then identify the team role they most associate with, followed by a discussion on the distinction between skills and team roles, and their significance in professional collaboration. This exercise aims to enhance participants' awareness of their own strengths and weaknesses within a team, while also highlighting the importance of diverse team roles for effective collaboration.

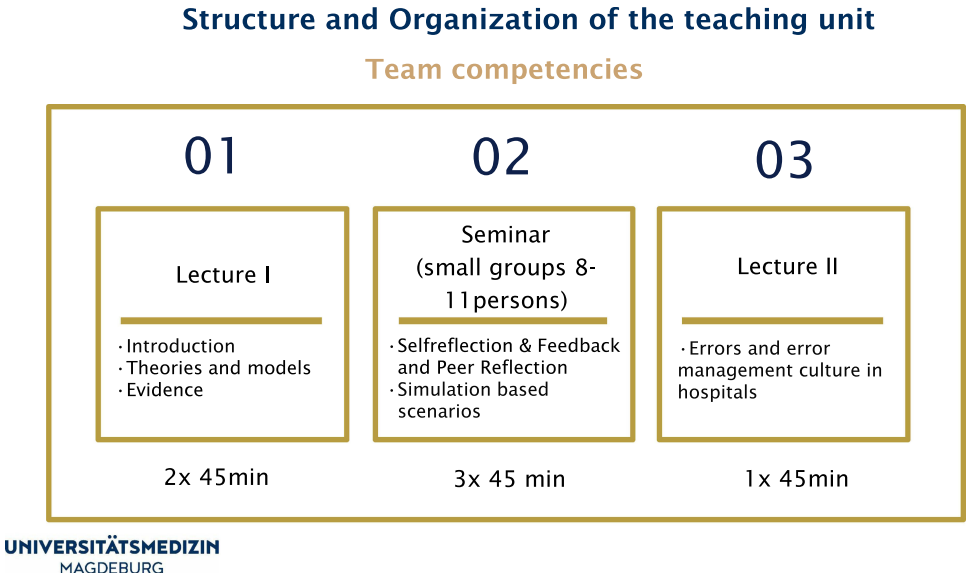

Figure 3 Overview of the content.

Next, an introductory session on feedback is conducted to prepare participants for the feedback rounds in the two role-play scenarios. The objectives and guidelines for giving and receiving feedback are established collaboratively with the group, emphasizing the roles of both the sender and the receiver. Particular emphasis is placed on the 3W feedback rule (Wahrnehmung, Wirkung, Wunsch — Observation, Impact, Wish), which is made visible to the group in the seminar room. This helps ensure a constructive feedback process and lays the groundwork for productive discussions.

In the first simulation-based scenario, participants conduct an emergency medical handover in small groups using the SBAR framework (Situation, Background, Assessment, Recommendation).[28] This structured communication method facilitates the effective and precise transfer of relevant information between healthcare professionals, thereby enhancing patient safety. In small groups, the SBAR framework is briefly reviewed, and roles are assigned (medical personnel, nursing staff, and observers). Before starting the role-play, participants receive their role scripts, and a realistic practice environment is set up. Observers are provided with a structured feedback form to evaluate the teamwork and behaviors demonstrated by the role-players. The role-play is conducted simultaneously across all groups. Following the handover scenario, participants engage in a structured process of self- and peer-reflection. This is followed by a group discussion in which participants share their self-assessments, peer feedback, and observations. The session concludes with a plenary discussion in which participants reflect on their experiences with giving and receiving feedback. Additionally, the group explores why a comprehensive culture of constructive feedback is not yet widespread in healthcare, and how participants can actively contribute to fostering this practice in their future medical careers.

To prepare for the second simulation scenario, participants first engage in a plenary discussion on the key characteristics and prerequisites of an interprofessional (IP) ward round. The students are then divided into four small groups, each tasked with identifying the goals and responsibilities of key professional roles relevant to the upcoming role-play: ward physician, medical intern, nurse, and social worker. Roles for the IP ward round are assigned in a way that ensures participants who were observers in the previous session now take on active roles. The role-players prepare using the provided scripts, while the new observers focus on specific aspects of the exercise—such as the structure, verbal communication, and paraverbal and nonverbal cues. The role-play includes a variety of scenarios, enabling flexible emphasis on different professional roles and offering diverse learning experiences in IPC. A particular challenge arises with the elderly patient in the scenario, who wishes to be discharged, although the professionals involved do not yet consider this clinically appropriate. Following the role-play, participants are asked to evaluate the effectiveness of the interprofessional collaboration on a scale ranging from 0 to 10. Role-players reflect on their experiences in their assigned roles, while observers offer feedback based on their designated focus areas. Participants then engage in a discussion on the feasibility of implementing IP ward rounds into routine clinical practice. The session concludes by prompting participants to reflect on how they can further contribute to promoting interprofessional collaboration in medicine beyond the seminar.

Evaluation Concept

The evaluation of the teaching unit was conducted using a multimodal approach and was approved by the ethics committee of the medical faculty of the Otto-von-Guericke-University Magdeburg (66/24). Prior to the study, informed consent was obtained from all participants after they were thoroughly informed about the study's objectives, procedures, and data handling. At the end of the seminar, students completed an evaluation form specifically designed for assessing this seminar. The aim of this work is to reflect on the seminar from various perspectives (instructors, students, and observers) and, through this participatory involvement, foster the appropriate further development of the teaching unit. Instructors focused their self-reflection on the feasibility of the teaching methods. From the students' perspective, the teaching unit was reflectively examined in terms of their learning experiences. Expert et.al, with domain-specific and/or didactic expertise, conducted structured observations of the instructional content and teaching methods. Peer observations were conducted at the beginning, middle, and end of the teaching period. Observers and the instructor engaged in regular exchanges to address immediate improvement needs, particularly those related to structure. In addition to structural aspects like timing, spatial conditions, and group size, the primary focus was on interactional components. Based on the observation framework provided by the Peer Hospitation Package of TH Köln,[29] the following key observation areas were defined: interaction with students, relevance to both theoretical knowledge and practice, and student engagement and participation. Observations were documented in written reports and then consolidated to provide a comprehensive

overview. This process facilitates a systematic evaluation and identification of areas for improvement in both the structural and interactional aspects of the teaching unit.

Participants of the Teaching Unit

All third-year medical students enrolled at UMMD during the summer semester participated in the seminar, as it is a mandatory course. A total of 197 students attended, with sessions conducted in small groups of 7–12 participants. Participation in the associated hybrid lectures was optional. No students were excluded from the seminar, as it was an integral part of the curriculum. The cohort included a diverse range of prior experiences with interprofessional collaboration (eg, previous nursing training), which was taken into account in the design and execution of the course.

Results

The analysis of the teaching unit was approached from various perspectives, including those of the instructor, students, and educational experts. The following reflections highlight the seminar's strengths, challenges, and areas for improvement, with a particular focus on fostering interprofessional collaboration and learning.

Reflection from the Instructor's Perspective – Structured Feedback Supports Learning, but Additional Time for Feedback is Needed

The conceptual design of the seminar was feasible. However, recalling the theoretical knowledge from earlier lectures proved challenging, requiring a review of foundational concepts during the seminar. The self-reflection exercise based on Belbin's team roles should have a more practical focus in the future. The two role-playing scenarios effectively provided students with realistic yet safe learning experiences, enabling them to adopt the perspectives of other professions. The learning experience varied depending on how the students engaged with their assigned roles. Structuring the feedback—particularly for the first role-play—encouraged more differentiated and focused responses. This approach was perceived as both helpful and somewhat limiting. During the preparation, execution, and debriefing of the second role-play, which focused on the IP ward round, students were able to draw on their prior professional experiences. In terms of timing, the seminar structure was adequate for most groups; however, future sessions should allocate more time for feedback following the IP ward round role-play.

Reflection from the Students' Perspective – Simulation-Based Scenarios and Self-Reflection Fostered Openness to Interprofessional Collaboration

For the first time in their studies, this learning unit provided students with a space to consciously engage with interprofessional (IP) thinking and practice in everyday clinical settings. The brief theoretical input, combined with the self-reflection exercise on team roles, offered an engaging and interactive introduction to the seminar. Implementing the role-plays in small groups reduced initial barriers and encouraged greater openness to adopting different professional perspectives. Additionally, the opportunity to apply feedback theory in practice proved invaluable. Through self-reflection and adopting the roles of other professions in the simulation-based scenarios, students developed a deeper appreciation and understanding of interprofessional collaboration. In future sessions, more time should be allocated for debriefing the interprofessional ward round simulation to more thoroughly address collaboration challenges and explore the feasibility of interprofessionalism in clinical practice. Furthermore, consideration should be given to how collaboration with trainees from other healthcare professions can be integrated, creating opportunities for shared learning experiences within the scope of professional training.

Reflection from a Professional-Content Perspective – Openness to Communication and Feedback Enhanced Learning Outcomes

Classroom observations indicated a strong openness among students to improve their communication and relationship-building skills in interprofessional interactions. The self-reflection exercises served as an effective topical introduction, activating both introspection and mentalization skills. The content structure gradually introduced the demands and possibilities of IP communication, both in group settings and individual contexts. Additionally, the recurring emphasis

on feedback and feedback culture helped establish a solid theoretical foundation, which was reinforced by the students' own experiences. It became evident that collaboratively developed foundational principles and attitudes contributed to valuable learning experiences and established a shared basis for discussion. Deviations from agreed-upon feedback rules were often addressed constructively. The students largely took advantage of the opportunity to share their own experiences and express their individual preferences. Incorporating Belbin's team roles into the second role-play could further highlight their fundamental importance and deepen students' awareness of their own personality traits. Overall, the ability to assume roles and create a meaningful experiential learning context depended largely on the students' openness. This also underscored the relevance and necessity of the course.

Reflection from a Didactic Perspective – Flipped Classroom and Reflection Assignments Could Enhance Learning Outcomes

Based on the classroom observations, the following didactic recommendations were discussed: Firstly, it should be considered whether adapting the seminar to a flipped classroom format—a model in which students study content beforehand and use classroom time for hands-on application and reflection—could enhance the students' learning experience. This approach could ensure that participants arrive with a solid understanding of the foundational content, allowing these elements to be shifted outside of class time. Secondly, the time gained through this adaptation could be invested in a more in-depth examination of the distinction between professional (ie, those defined by one's profession) and personal roles within a team, including strengths and weaknesses as conceptualized in Belbin's team role framework. This would further promote reflective practice among students and foster the development of their professional attitudes. Thirdly, in line with the concept of Constructive Alignment, it may be beneficial to introduce an assessment component for this thematic series. Given that this seminar serves as the introductory course to IPC in healthcare, focusing on attitude development seems especially relevant. A non-graded reflection assignment could be implemented. Guiding questions might include: In which situations do you collaborate with other healthcare professionals in your medical practice? What expertise do other professions bring to the table? How feasible do you find IP ward rounds in the clinical setting, and what role can you play in their implementation? What insights or takeaways from this seminar will influence your future professional practice? These changes would help deepen the learning process and align the course more closely with the development of a collaborative, interprofessional mindset.

Discussion

The introduction and evaluation of this teaching module represent a significant step toward the integration of interprofessional competencies into the curriculum. In addition to providing theoretical foundations, the unit addresses key competencies such as self-reflection, role perception (based on Belbin's model), clarity of tasks and objectives across various professional groups, and the training of cooperative scripts through the SBAR framework. Notably, simulation-based learning is emphasized, as it enables practical application of interprofessional problem-solving. The promotion of a feedback culture is fundamental to the success of this learning process, fostering the development of appreciative attitudes and the ability to take on different perspectives. Consequently, this teaching module addresses core concepts essential to IP education.[16]

For further development, plans include the introduction of an online self-learning module to provide essential theoretical knowledge in advance, thereby freeing up more time for feedback on the second role-play and for a deeper exploration of Belbin's team roles. This is expected to enhance self-awareness and understanding of others within teams, help overcome hierarchical barriers and role ambiguities, and reduce the potential for conflicts.[22,23] The future integration of video feedback aims to deepen reflection and enable students to conduct more thorough analyses of their communication and collaboration skills.[21] Thus, the first module on IP collaboration will specifically deepen foundational aspects of perception, appreciation, communication, and understanding—key elements of an IP mindset.[30]

The implementation of interprofessional education (IPE) into medical training and curricula has shown significant benefits. However, potential barriers—such as the need for faculty development and resistance to IPE—must be thoughtfully considered and proactively addressed. Therefore, successfully integrating interprofessional education requires both structural and personnel support to ensure its sustainability and effectiveness.

To support the longitudinal and continuous development of interprofessional competencies, closer integration with other teaching modules is planned. For instance, in the "Medical Communication" unit, sequential role-plays will be used to simulate treatment-related conversations and IP case conferences. Additionally, the involvement of various healthcare professions in psychosomatic medicine will be given greater emphasis, fostering collaboration and mutual appreciation among professional groups.

While the teaching module proved to be feasible, several limitations must be taken into account. First, the study was conducted at a single institution, which limits the generalizability of the findings. Furthermore, the long-term impact on clinical practice remains uncertain, as follow-up assessments are needed to evaluate the retention and application of acquired skills. Lastly, while simulation-based scenarios offered a safe learning environment, real-world interprofessional interactions are more complex and require further adaptation, as well as exposure to authentic clinical settings.

The theoretical implication of this study lies in reinforcing the importance of structured interprofessional education (IPE) by fostering collaborative competencies. Additionally, it contributes to the advancement of educational strategies in medical training by emphasizing the role of simulation, feedback culture, and reflection as core elements of the learning process. The practical implication of this study lies in supporting the structured implementation of IPE within medical curricula. Expanding simulation-based learning, structured feedback, and role-play exercises can help bridge the gap between theoretical instruction and practical clinical application. By fostering teamwork, communication, and mutual understanding among healthcare professionals, these approaches have the potential to enhance collaboration and improve patient care.

Fully leveraging the potential of interprofessional collaboration[31] remains a challenging, complex, yet rewarding task. A structured, practice-oriented approach to teaching IPC competencies is essential for fostering an appreciative attitude and enhancing teamwork effectiveness. This directly enhances healthcare delivery by effectively preparing students to address IPC challenges in real-world practice. By fostering collaboration and mutual respect among healthcare professionals, such initiatives improve patient care and lead to better health outcomes.

Conclusion

Developing interprofessional and teamwork competencies require intentional reflection on both one's own role and the roles of other healthcare professionals. This self-awareness cultivates a deeper understanding of team dynamics and collaboration. Additionally, teaching and practicing constructive feedback is essential for fostering an environment that encourages continuous learning and mutual respect among team members. Incorporating simulation-based learning scenarios offers a practical and engaging way to teach and reinforce these skills, preparing healthcare professionals to collaborate effectively in interdisciplinary teams and deliver high-quality care. Future studies should examine the long-term impact of these training initiatives on clinical performance, evaluating how enhanced teamwork competencies translate into real-world healthcare settings. Longitudinal research could offer valuable insights into the sustainability of these skills and their impact on patient outcomes, interprofessional collaboration, and workplace culture.

Funding

We gratefully acknowledge funding for the "Teaching Initiative Project Python at the Faculty of Medicine, Magdeburg", which supported this work. The sponsor(s) had no involvement in the study design, data collection, analysis, interpretation, or writing of the manuscript.

Disclosure

All authors reports personal fees from Otto-von Guericke University, outside the submitted work. The authors report no other conflicts of interest in this work.

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