



Identification of barriers and facilitators of successful interprofessional education (IPE) – a scoping umbrella review

Identifizierung der Einflussfaktoren für die interprofessionelle Ausbildung (IPE) – ein Umbrella Scoping Review

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Abstract

Objective: The study aims to provide an overview of factors influencing interprofessional education (IPE).

Method: A systematic literature search was performed using the databases MEDLINE, CINAHL, PsycINFO, Embase, and Cochrane Library. Two reviewers conducted the study selection and data analysis. Subsequently, the factors influencing IPE were summarized through qualitative narrative synthesis.

Results: The search yielded 1,040 results, of which 10 studies were ultimately included. The influencing factors that were identified were clustered into three dimensions: learners, educators, and institutions. Reviewing the selected studies, it became evident that all influencing factors are closely interdependent. In the learners' dimension, the construct of diversity, related to group formation and the strengthening of their sense of belonging, was identified as a facilitating factor for IPE. Thus, it appears that the formation of an interprofessional identity has a positive impact on the constructs mentioned. Moreover, the competence of the educators, and the combination of teaching methods, were crucial factors for sustainable IPE. Institutional support plays a facilitating role.

Conclusion: The overview results of this study can be used to identify areas for improvement and changes in IPE. Crucial for institutions is the support through management and leadership, along with the implementation of effective faculty development concepts. Further research on IPE is needed to extend understanding of the constructs of diversity, team efficiency and interprofessional identity, as well as the respective relations between them.

Abstract

Ziel: Das Ziel der Studie ist es, einen Überblick über die Einflussfaktoren von IPE zu schaffen.

Methode: Die Datenbanken MEDLINE, CINAHL, PsycINFO, Embase und Cochrane Library wurden mittels einer systematischen Literaturrecherche durchsucht. Zwei Reviewerinnen führten die Studienauswahl und Datenanalyse durch. Die Einflussfaktoren wurden mithilfe einer qualitativen, narrativen Synthese zusammengefasst.

Ergebnisse: Die Recherche ergab 1040 Treffer. Final wurden zehn Studien eingeschlossen. Die identifizierten Einflussfaktoren von IPE wurden in drei Hauptdimensionen geclustert: Lernende, Lehrende und Institutionen. Dabei wurde deutlich, dass alle Einflussfaktoren in einer engen Interdependenz zueinanderstehen. In der Kategorie der Lernenden wurde das Konstrukt der Diversität in Zusammenhang mit Gruppenzusammenstellung und Stärkung des Gefühls der Zugehörigkeit als Förderfaktor für IPE identifiziert. Es scheint, dass die Bildung einer interprofessionellen Identität sich positiv auf die genannten Konstrukte auswirkt. Die Kompetenz der Lehrenden sowie die Kombination von Lehrmethoden waren entscheidende Einflussfaktoren für eine nachhaltige IPE. Institutionelle Unterstützung spielt dabei eine förderliche Rolle.

Fazit: Die Übersicht der Einflussfaktoren kann zur Identifikation von Verbesserungs- und Änderungspotenzialen für IPE genutzt werden. Es bedarf der Unterstützung der Führungsebene sowie die Entwicklung und Integration von IPE-Schulungskonzepten für Lehrende. Weitere Forschung für IPE wird benötigt, um die Konstrukte und Zusammenhänge der Diversität und Teameffizienz in Bezug zur interprofessionellen Identitätsbildung tiefer zu verstehen.

Keywords

Facilitators – Barriers – IPE – Faculty Development – Interprofessional Identity

Keywords

Förderfaktoren – Barrieren – interprofessionelle Ausbildung – Fakultätsentwicklung – interprofessionelle Identität



INTRODUCTION

In reports and recommendations addressing the need for change in the healthcare sector for the near future, interprofessional care is accorded a prominent position (Robert Bosch Stiftung, 2013, 2011; Wissenschaftsrat, 2012; Frenk et al., 2010; Sachverständigenrat, 2007). Interprofessional education (IPE) plays an important role in this context, as indicated by its definition: IPE refers to “Occasions when two or more professions learn with, from, and about each other to improve collaboration and the quality of care” (Barr, 2002). In the Framework for Action on Interprofessional Education and Collaborative Practice, the World Health Organization (WHO) identified several mechanisms to align interprofessional education at the practice level (WHO, 2010). The key mechanisms are divided into educator and curricular mechanisms. Examples of influential educator mechanisms are staff training, institutional support, and learning outcomes. In contrast, for curricular mechanisms, factors such as logistics and scheduling, program content, adult learning principles, assessment, and learning methods have an impact on IPE (WHO, 2010).

These identified mechanisms shape 1) Interprofessional education (IPE); 2) Interprofessional practice (IPP); and 3) Health and education systems. The WHO (2010) emphasizes that the mechanisms between IPP and IPE mutually influence each other. Furthermore, the International Centre for the Advancement of Interprofessional Education (CAIPE) not only endorses the WHO framework, but also actively strives to fulfil its mission to generate, synthesize, and translate evidence of best practices in interprofessional education and collaborative practice. In fact, the CAIPE 2022-2027 strategy document places a distinct emphasis on the improvement of health outcomes for all. This can be achieved by prioritizing best practices in research, setting a quality standard, support faculty development, and the translation of evidence into practice [<https://www.caipe.org/strategy>].

In Germany, various approaches have been taken to implement recommendations regarding IPE. Within the aim of strengthening IPE and IPP, the Robert Bosch Foundation launched various funding activities for interprofessional teaching and learning in Germany with the Operation Team initiative that ran from 2013 until 2022 (Nock, 2020). In addition, the topic of interprofessionalism is increasingly being considered in legislative changes, such as in the nursing professions (Bundesministerium der Justiz, 2018), or in the national competency-based learning objective catalogue for medicine (Nationaler Kompetenzbasierter Lernzielkatalog Medizin NKLM 2.0). Despite these developments, there is still an urgent need to strengthen and improve interprofessional education

and collaboration in the health sector, considering the increasing complexity of health care due to demographic and technological changes (Kaap-Fröhlich et al., 2022). Therefore, it is necessary to better understand the factors influencing IPE and their interrelationships.

With this in mind, this study aims to provide an overview of all influencing factors of IPE, according to reviews published beginning in 2014. This overview can help institutions and educators identify areas for improvement in how they address IPE and develop effective teaching and learning formats for it or revise their existing offerings accordingly. For the study, the following research question arises: What influencing factors do exist in interprofessional education?

METHOD

Design

The study is an umbrella scoping review. Combining an umbrella review and a scoping review is the most effective approach to achieve the objective of this study, which is to identify the influencing factors for IPE. Conducting an umbrella review is appropriate to this project, as there are already several systematic reviews available on the topic (Hammick et al., 2007; Reeves et al., 2017). This approach avoids redundant searches, screening individual studies, and synthesizing existing studies, and provides a good overview of the current state of the research field (Aromataris et al., 2015). It can also help uncover potential discrepancies or conflicting results (Aromataris et al., 2020).

The methodology of the scoping review also allows for the identification of influencing factors for IPE. The included reviews are not limited to systematic reviews (Munn et al., 2018). This is particularly important for a concept like IPE, as there are many qualitative studies available. The study followed the methodology for scoping reviews proposed by the Joanna Briggs Institute, with the specific inclusion criterion of including only reviews in the search process (Peters et al., 2020).

Protocol

A research protocol has been developed, which can be accessed at the following address https://1drv.ms/w/s!AiVcI8peCpyUIdBliUg2_uBhMoARPQ?e=Y36QDK. In addition, the PRISMA checklist was used to assess the quality of scoping reviews.

Inclusion and exclusion criteria

For the research and selection of studies, the inclusion and exclusion criteria were defined following the



Table 1: Overview of inclusion and exclusion criteria

Variable	Inclusion criteria	Exclusion criteria
Population	≥ two different health professions Students/trainees from the health professions Trained health professionals	Only one health profession Health professions where the clients are not human, such as veterinarians Persons before the start of training or studies (pre-study internship)
Intervention	IPE*	IPP** Readiness for IPE/IPP with RIPLS***
Outcome	Focus on influencing factors, barriers, facilitating factors	Focus on effectiveness of the IPE programme and/or knowledge gain through the IPE program
Study design	All different review formats that have conducted a systematic literature review, e.g. systematic reviews, scoping reviews.	Empirical studies Reviews without systematic literature search
Setting	Teaching, clinical setting, education and training	

*IPE= interprofessional education / **IPP = interprofessional collaboration / ***RIPLS = readiness for interprofessional learning scale

PIOSC format (Population, Intervention, Outcome, Study Design, Context) (see Table 1). The study only included published reviews from 2014 onwards, written in German, English, or Dutch.

The selected literature had to include study participants who were involved in healthcare, either as students/trainees of a healthcare profession, or as qualified healthcare professionals. The included reviews had to encompass at least two different healthcare professions, and the participants had to have been involved in some form of IPE activity or workshop. Reviews that focused on investigating influencing factors, such as barriers and/or facilitators of IPE, were included. Various review formats that conducted a systematic literature search, such as systematic reviews and scoping reviews, were included in the search. All the different contexts in which IPE can take place were included in the research and study selection.

Reviews that only included one healthcare profession, or reviews with participants from healthcare professions that did not involve the treatment of humans (i.e., veterinarians), were excluded. Reviews that focused on individuals before the start of their education or training, such as those in pre-practicum, were also excluded. Reviews that did not specifically focus on the concept of IPE, but rather on the concept of IPP (interprofessional practice) or interventions that assessed readiness for IPE/IPP by using the Readiness for Interprofessional Learning Scale (RIPLS), were also excluded. The latter was excluded because Mahler et al. (2014) found no internal consistency for RIPLS in the German context and does not recommend its use for investigating the readiness for IPE.

Reviews that examined the concept of IPE and additionally addressed IPP and/or readiness for IPE/IPP (without RIPLS) were included, but only the results related to IPE were evaluated. Furthermore, reviews that focused on the effectiveness of IPE programs and/or knowledge gained

from the IPE program were excluded. Reviews without a systematic literature search and empirical studies were excluded. All the different settings in which IPE can potentially take place were considered in the research and study selection.

Search Strategy

A three-step search strategy was performed (Peters et al., 2020). At first, an initial search was conducted in the MEDLINE (PubMed) and Cochrane Library databases. The titles, abstracts, and keywords of the articles found in this search were examined for synonymous search terms. Second, search strings were created for the databases to be searched, including MEDLINE (PubMed), CINAHL (Ebsco Host), PsycINFO (Ebsco Host), Embase (Elsevier), and Cochrane Library. To document the process, the template from RefHunter was used (Hirt & Nordhausen, 2020). A librarian reviewed the search string, and optimization of the search string was carried out according to their recommendations. This involved specifying the keywords used in each database. The final search string used for MEDLINE is provided in [Appendix 1](#). The literature search was conducted on November 16, 2022. There was no hand search carried out in specific journals, or any other form of grey literature search. Finally, the reference lists in the included reviews were also searched for additional studies.

Study Selection

The study selection was conducted using the web tool CADIMA (Julius Kühn-Institut (JKI), 2023). After identifying and removing duplicates, the title-abstract screening was performed by two reviewers (JW and MH). Both reviewers reviewed the titles and abstracts of the identified studies independently. They classified the studies into one of three categories, labelled as *inclusion*,

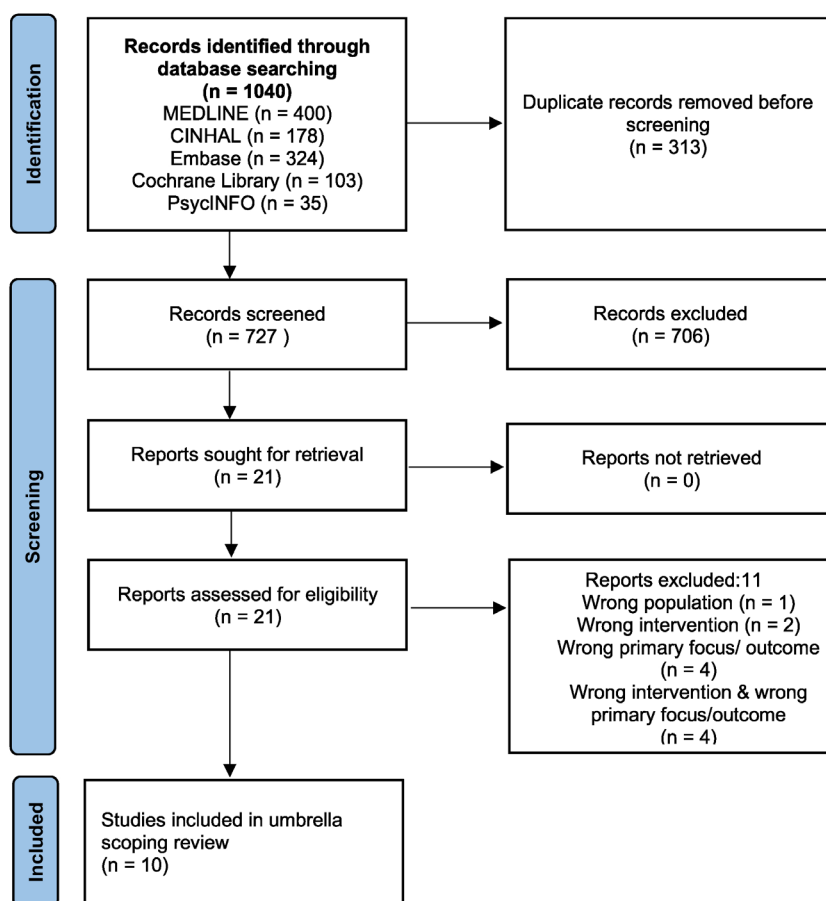


Figure 1: PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Flow Diagram.

exclusion, or uncertain, based on the predetermined inclusion and exclusion criteria. The assignments were compared, and in cases where both reviewers classified a study as uncertain or provided conflicting categorizations, there was a discussion between the researchers to reach a consensus. The same approach was applied during the full-text screening, with a justification provided for the exclusion of studies.

Data Extraction and Analysis

For data extraction, an Excel table was created following the JBI template for scoping reviews (Peters et al., 2020). The extracted data from each included review encompassed author(s), title, publication year and country, objective/ research question, participants, context, review type, search strategy, inclusion and exclusion criteria, number of included studies, data extraction and analysis, results related to the influencing factors of IPE, limitations, and conclusion or key findings.

Following data extraction, the influencing factors were synthesised using a qualitative narrative synthesis

approach based on the research questions (Booth et al., 2016; Rumrill & Fitzgerald, 2001). This approach allows for the examination of studies that differ in their research questions, samples, and methods, and characterizes the results into multiple categories using textual data (Popay et al., 2006).

The development of categories was an iterative process. Initially, the analysis levels of micro, meso, and macro levels were used. We choose this frame of reference in order to be able to analyze the influencing factors from a holistic perspective that included individual, organizational and societal perspectives. Both reviewers assigned the extracted influencing factors to a specific level. If appropriate, they independently developed subcategories to further summarize the results. The level assignments were compared, additional subcategories were developed, existing ones were summarized or modified, and main categories were formed. These main categories departed from the original analysis levels of micro, meso, and macro levels, focusing instead on the main dimensions of learners, educators, and institutions. Overall, this process was highly dynamic and based

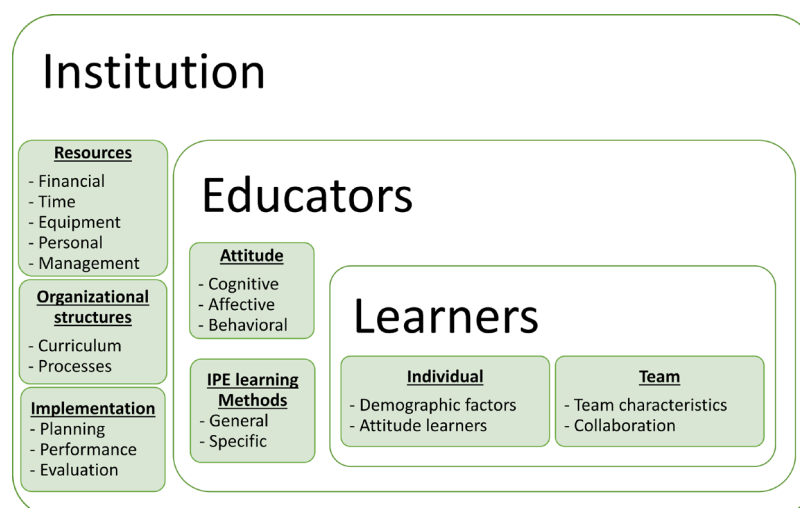


Figure 2: Model of the interrelated dimensions of the influencing factors for IPE.

on both the extracted influencing factors (inductive approach) and existing theoretical constructs (deductive approach).

RESULTS

Out of 1040 records identified in the individual databases, ten reviews were ultimately included in the umbrella scoping review. An overview of the characteristics of the included reviews is provided in [Appendix 2](#). The PRISMA flow diagram displays the number of included and excluded studies at each phase of the process (see Figure 1).

Characteristics of the included reviews

The included reviews originate from eight different countries. Two reviews each were from the United States and the United Kingdom, and Australia, New Zealand, Indonesia, Japan, South Africa, and the Netherlands each contributed one review. The reviews were published between 2014 and 2022. Most of the studies ($n = 4$) were published in 2016.

In total, the reviews included between 12 and 65 studies, with a total number of 336 studies included. These included studies were published between 1995 and 2022. The most common type of included review was the systematic review ($n = 4$), followed by the scoping review ($n = 2$). The participants in the reviews consisted of students, educators, and healthcare professionals, with some additional participants from the social sector. The context in which IPE was conducted encompassed various settings, including both educational and clinical settings within the scope of training.

In summary, there was wide variability and heterogeneity among the included reviews. Most reviews focused on a

specific aspect, whether it was population, intervention, context, or study design. For example, one study looked at the basis for IPE and considered the effectiveness of different types of IPE activities (Reeves, Fletcher, et al., 2016). This study analyzed the key aspects of the context (presage), related mechanisms (process), and associated outcomes (product) based on the 3P model (presage, process, product by Freeth & Reeves, 2004). Another study specifically focused on the teaching method of simulation-based training with at least two different health professions (Palaganas et al., 2016). Another study only addressed IPE in the clinical setting and focused instead on learners' perceptions in medical and nursing education (Visser et al., 2017). Another study solely focused on faculty development in IPE (Watkins, 2016). One study encompassed IPE in the context of midwifery (Madisa et al., 2022), and another study included only qualitative studies in the review (Reeves, Pelone, et al., 2016).

The study of Reeves, Pelone et al. (2016) focused on teacher, in this context a facilitator who conducted IPE with learners from health and social care backgrounds. One study aimed to identify challenges or barriers, and initiatives to overcome them, from developed countries in order to anticipate how to solve those challenges in developing countries. The authors followed the World Health Organization (WHO) approach of implementing IPE in all countries (Sunguya et al., 2014).

The results of the qualitative narrative synthesis are summarized in figure 2. The figure illustrates all the identified influencing factors of IPE into three main dimensions, displayed as Learners, Educators, and Institutions. The overlapping rectangles represent the interdependence of all the influencing factors (see Figure 2).

Table 2: Overview of IPE influencing factors from the perspective of the learners at the individual level.

Dimension	Identified influencing factors learners in IPE - individual level
<i>Personal characteristics</i>	
<i>Demographic factors</i>	(0) age and gender [5, 8] (+) younger students [5]
<i>Attitude learners</i>	
<i>Cognitive component</i>	(0) (previous) experiences [3, 5, 9] (-) own role uncertainty [3, 8, 9] (-) lack of knowledge about each other profession [1, 3, 5, 8] (-) focus on professional knowledge [9]
<i>Affective component</i>	(+) enthusiasm and motivation [8, 9] (-) students thought it was time-wasting [8] (-) reserved style [9] (-) lack of respect [1, 3] (-) feeling threatened [9] (-) fear about loss of professional identity [8, 9] (-) distrust [3, 9]
<i>Behavioural component</i>	(+) respect and interest in IPE [5, 9] (-) monoprofessional self-identity [1, 9] (-) role and professional identity uncertainty [8, 9] (-) arrogant and aggressive behaviour [9] (-) professional stereotypes [5, 8, 9] (-) lack of clear expectations [8, 9] (-) status [9]

Legend: [1] Lawlis et al., 2014; [2] Madisa et al., 2022; [3] McNaughton, 2018; [4] Palaganas et al., 2016 [5] Reeves, Fletcher et al., 2016; [6] Reeves, Pelone et al., 2016; [7] Riskiyana et al., 2018; [8] Sunguya et al., 2014; [9] Visser et al., 2017; [10] Watkins et al., 2016. (-) barrier; (+) facilitator; (0) barrier or facilitator, depending on the context. IPE = Interprofessional Education

IPE-related influencing factors: Learners

The influencing factors related to the dimension of learners were identified at both the individual and team levels. At the individual level, factors were categorized into personal characteristics and attitudes of the learners (see Table 2). Following the definition of attitudes from the Online Dictionary of Psychology and Pedagogy, the “attitude category” was subdivided into cognitive, affective, and behavioral components (Stangl, 2023). At the team level, distinctions were made between team characteristics and collaboration (see table 3). The identified influencing factors were weighted as barriers, facilitators, or general influencing factors. The attribution of certain influencing factors could depend on the perspective taken. For example, IPE goals had a facilitating effect when clearly defined goals were set, but conversely functioned as barriers when these goals lacked clarity. Furthermore, in some cases the reviews have presented diverse and occasionally contradictory outcomes concerning these factors, such as those concerning the role of previous practical experiences.

Individual level

The category of “personal characteristics” includes a subcategory for learners’ demographic factors. Age and gender were identified as influencing factors. (Reeves, Fletcher, et al., 2016; Sunguya et al., 2014). Reeves, Fletcher, et al. (2016) found that younger students generally rated their interprofessional relationships more positively, but on the other hand, older students showed a more active role in IPE participation. Their study did not find significant effects of gender on the provision of IPE. In the category of “attitudes,” assumptions and beliefs were grouped under the cognitive component (Stangl, 2023). Previous practical experiences was sometimes seen as a facilitator and sometimes as a barrier. Previous experiences were considered a barrier when they led to unclear roles or were associated with differences in status (McNaughton, 2018; Reeves, Fletcher, et al., 2016). Previous experiences worked as facilitators, however, when nursing and medical students had positive experiences in interprofessional collaboration (Visser et al., 2017). Other influencing factors were students’ respective knowledge bases and their perception of professional roles (Lawlis et al., 2014; McNaughton, 2018; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017). The degree to which students performed their professional roles and incorporated their knowledge into collaborative efforts determined whether they fostered or hindered interprofessional teamwork (Visser et al., 2017). A lack of knowledge about the backgrounds and strengths of other professions, prioritizing professional knowledge, and role uncertainty were all identified as barriers (Lawlis et al., 2014; McNaughton, 2018; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017).

The subcategory of the affective component included feelings and emotions related to IPE (Stangl, 2023). Enthusiasm and motivation for IPE were identified as facilitators (Sunguya et al., 2014; Visser et al., 2017). Perceiving IPE as a waste of time was seen as a hindrance (Sunguya et al., 2014). Negative emotions such as distrust and fear of losing professional identity also had negative impacts (McNaughton, 2018; Sunguya et al., 2014; Visser et al., 2017).

The behavioral component resulted from the cognitive and affective components, thereby exerting an impact on the overall attitude. Respect and interest for IPE were considered facilitators (Reeves, Fletcher, et al., 2016; Visser et al., 2017), and barriers included a monoprofessional identity orientation, as well as arrogant and aggressive behavior (Lawlis et al., 2014; Sunguya et al., 2014; Visser et al., 2017). Three of the reviews analyzed the presence of professional stereotypes and their differences in status as inhibiting factors for IPE (Reeves,



Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017). Students reported that when imbalances in hierarchy and status are perceived, it leads to negative stereotyping, especially between the two professional groups of nursing and medicine (Reeves, Fletcher, et al. 2016).

Team level

The dimensions of learners at the team level included team characteristics and collaboration. The category of team characteristics was divided into subcategories of “group composition” and “diversity.” The subcategories of collaboration were based on Golom and Schreck (2018) and included goals, team processes, roles, and interpersonal relationships (see Table 3).

First, in the category of team characteristics, the composition of the group was examined. Regarding group composition, meaning which and how many professions should be represented in a group, most studies did not report a process for matching learner levels during interprofessional simulation training (Palaganas et al., 2016). Reeves, Fletcher, et al. (2016) mentioned in IPE context two to six different professions with a number of 30-100 learners. Visser et al. (2017) indicated small groups as a promoting factor without specifying an exact number. In the subcategory of diversity, it became apparent that differences and heterogeneity generally acted as challenges (Lawlis et al., 2014; McNaughton, 2018; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017). However, a lack of diversity, especially in small groups, has also been identified as a barrier (Visser et al., 2017). Mismatches in age, previous work experience and profession could also affect the performance of IPE (Reeves, Fletcher, et al., 2016; Sunguya et al., 2014). In this context, students might develop a poorer perception of interprofessional interaction if they have had previous experience with higher-status professionals (Reeves, Fletcher, et al., 2016). Differing levels of experience are cited as barriers. For example, educators in particular needed to make specific efforts to link materials to professionals’ experiences (Sunguya et al., 2014).

In the category of “collaboration,” the formulation of clear IPE goals was identified as a positive influencing factor for IPE (McNaughton, 2018). Goals become barriers when there is a combination of profession-specific and interprofessional orientations in goal-setting, thus creating pressure for different interests to be represented (Visser et al., 2017).

In terms of team processes, Visser et al. (2017) emphasize unfamiliarity as an influencing factor. When students from different professions do not know each other, time is needed for them to become familiar with each other.

Table 3: Overview of IPE influencing factors from the perspective of the learners at team level.

Dimension	Identified influencing factors learners in IPE - team level
<i>Team characteristics</i>	
<i>Composition</i>	(0) age and gender [5, 8] (0) number of professions and group size [4, 5, 9]
<i>Diversity</i>	(0) mismatch in age, profession, and differences in experiences [5, 8] (-) lack of diversity in small learning groups [9] (-) different levels of learning [9] (-) differences in workload [3] (-) differences in the knowledge base [3, 8] (-) different learning needs [8] (-) differences in experiences [3, 8] (-) different learning styles [1, 8] (-) different professional jargons [8]
<i>Collaboration</i>	
<i>Goals</i>	(+) clear IPE goals [3] (-) unclear or irrelevant IPE goals [3] (-) profession-specific goals in combination with IPE goals [9]
<i>Team processes</i>	(+) common values for IPE [8] (+) effective communication [8]; open communication style [9] (+) make joint decisions in agreement [6] (+) urgency [9] (-) unfamiliarity [9] (-) lack of active engagement in team tasks [9] (-) lack of conflict resolution strategies [3]
<i>Roles</i>	(+) own role clarity [8, 9] (+) equal status [9] (+) team identity; being part of a ‘supra-identity’ [2] (-) different role expectations [8, 9] (-) medical profession is usually perceived as dominant to other professions [8] (-) focusing on one’s own profession [8, 9] (-) professional stereotyping [5, 8, 9]
<i>Interpersonal relationships</i>	(+) building interprofessional relationships/time to socialize [3, 9] (+) use of informal learning [5, 9] (+) trust and collegiality [9] (-) the more professionals are specialized, the more difficulties are to collaborate [8] (-) professional tribalism [8, 9] (-) status/power differentials [5, 8, 9] (-) not valuing others’ opinions [9] (-) conflicts or tensions between learners [8]

Legend: [1] Lawlis et al., 2014; [2] Madisa et al., 2022; [3] McNaughton, 2018; [4] Palaganas et al., 2016 [5] Reeves, Fletcher et al., 2016; [6] Reeves, Pelone et al., 2016; [7] Riskiyana et al., 2018; [8] Sunguya et al., 2014; [9] Visser et al., 2017; [10] Watkins et al., 2016. (-) barrier; (+) facilitator; (0) a barrier or a facilitator, depending on the context.

Shared values and a common understanding of IPE had a positive impact on team processes, and thus on IPE (Sunguya et al., 2014).

Communication has been considered a highly influential factor for IPE. Sunguya et al. (2014) emphasized the importance of developing an effective communication style among professional groups, particularly to reduce stereotypes. In contrast, inadequate conflict resolution



strategies were identified as a barrier (McNaughton et al., 2018). Another acknowledged barrier was a lack of active engagement in team tasks (Visser et al., 2017).

In the subcategory of roles, the clarity of one's own professional role was identified as a positive influencing factor for IPE. Engaging with others led to an increased understanding of one's own professional role, and to greater role clarity (Sunguya et al., 2014; Visser et al., 2017). Having an equal professional status was also beneficial. Person-centred IPE programs strengthened participants' sense of belonging to a "supra-identity", which had an overall positive impact on IPE (Madisa et al., 2022; Visser et al., 2017). Obstacles presented themselves in the form of conflicting role expectations, a dominance of medicine over other professions, or when the focus was solely on the knowledge base of one's own profession (Sunguya et al., 2014; Visser et al., 2017). Professional stereotyping in particular posed a barrier, primarily resulting from hierarchies and status (Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017).

The establishment and strengthening of interpersonal relationships have been identified as important facilitators in several reviews. Trust and collegiality are crucial factors. In promoting interprofessional relationships, the availability of time has been emphasized as a significant contributing factor. On one hand, time is needed to build familiarity and develop relationships. On the other hand, time is also required for informal learning (McNaughton, 2018; Reeves, Fletcher, et al., 2016; Visser et al., 2017). Negative factors categorized under the subcategory of interpersonal relationships included professional tribalism, hierarchies, and lack of valuing others' opinions, as well as conflicts and tensions among learners (Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017).

IPE-related influencing factors: Educators

Factors influencing educators in IPE were divided into three categories: attitudes of educators, general approaches and those specific to IPE teaching and learning methods. Broader considerations regarding instructional techniques also had an impact. Predictably, methodologies that centred around teamwork, collaborative activities, and supportive tools played an important role in IPE. Additionally, facilitators and obstacles related to specialized IPE learning approaches are outlined in Table 4.

Attitude Educators

Educators' attitudes were analyzed a similar fashion to learners' attitudes. Overall, the role of educators was considered to be a significant influencing factor (Lawlis

et al., 2014; Madisa et al., 2022; McNaughton, 2018; Palaganas et al., 2016; Reeves, Fletcher, et al., 2016; Reeves, Pelone, et al., 2016; Sunguya et al., 2014; Visser et al., 2017; Watkins, 2016). The reviews identified various dimensions through which educators can act as facilitators in IPE. The most frequently mentioned facilitator was the competence level of educators (Madisa et al., 2022; Reeves, Fletcher, et al., 2016; Reeves, Pelone, et al., 2016; Sunguya et al., 2014; Visser et al., 2017; Watkins, 2016). These included not only didactic competencies, but also competencies beyond just content. Educators needed to feel confident in their knowledge base of IPE (Watkins, 2016). Students stated that the role of an educator was to stimulate students to think, plan, and engage in interprofessional collaboration (Visser et al., 2017). Another important factor was teaching style, where an active and supportive style was considered beneficial (Visser et al., 2017).

Despite the beneficial components that educators can bring to IPE, according to current research, educators are often considered to be a barrier. The absence of the mentioned facilitating factors regarding the education and associated competencies of educators, is cited as a common reason (Lawlis et al., 2014; McNaughton, 2018; Palaganas et al., 2016; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017; Watkins, 2016). Additionally, organizational barriers such as inadequate time management and lack of preparation had a negative impact as well (Reeves, Pelone, et al., 2016; Sunguya et al., 2014).

General approaches IPE teaching-learning methods

IPE teaching and learning methods generally focus on interprofessional collaboration – that is, between people of different professions (Sottas et al., 2016). "IPE teaching" refers to teaching activities focusing on teams and their collaboration. Four categories of different components of IPE were identified: overarching approaches, supporting tools, e-learning, and continuing education. The reviews identified various facilitating factors as general approaches for IPE, such as a patient-centred approach (Madisa et al., 2022; McNaughton, 2018; Sunguya et al., 2014) and team-based approaches (Madisa et al., 2022; Palaganas et al., 2016; Riskiyana et al., 2018; Visser et al., 2017). Healthcare professionals who participated in successful IPE programs valued the team approach in education and the sense of belonging to a "supra-identity" that values patient-centred care. Importance was given to experiential learning through clinical or community practice and placements (Madisa et al., 2022; McNaughton, 2018; Riskiyana et al., 2018; Visser et al., 2017). Learners rated clinical internships as ideal and indispensable opportunities for acquiring IPE



Table 4: Overview of IPE-influencing factors from the perspective of educators.

Dimension	Identified influencing factors educators in IPE
<i>Attitude educators</i>	
<i>Cognitive component</i>	(+) competent educators [2, 5, 8, 9, 10] (+) knowledge of each other's roles [6] (-) inadequate faculty development specific to IPE [3, 9, 10] (-) inability to fully understand the IPE concept and its inherent value [1] (-) limited knowledge and skills [4, 8] (-) lack of clarity on (learning) goals [4]
<i>Affective component</i>	(+) enthusiasm, humour, and empathy [6] (-) lack of respect; lack of interest [8] (-) sense of academic elitism [8] (+) valuing diversity [10]
<i>Behavioural component</i>	(+) active engagement with other profession [9] (+) educating style: not just 'imparting knowledge' [8, 9] (-) educating style that corresponds to professional traditions [8, 9]. (-) condescension and defensiveness [8] (-) lack of preparations [5, 8] (-) unfamiliarity with teaching different professions [8] (-) time inadequacy [8]
<i>General approaches IPE teaching-learning methods</i>	
<i>Overarching approaches</i>	(+) patient-centred models [2, 3, 8] (+) team-based approaches [2, 4, 7, 9] (+) self-directed learning [9] (+) experiential-based learning through clinical or community practice and placements [2, 3, 7, 9] (+) teambuilding activities [2, 3, 7, 9] (+) team skills training [9] (+) training in team communication skills [9] (+) combining learning methods [2, 7] (-) employing a single learning method [7] (-) compiling case studies for students [7, 8] (-) silo approach [8]
<i>Supporting tools</i>	(+) creating a climate of safety and confidence among learners [5] (+) safe and supportive learning environment [2, 9] (+) creating a motivational environment, providing incentives [2] (+) diversity of educators; co-facilitation [2, 5, 9] (+) providing effective instruction [6] (+) debriefing [4, 5, 6] (+) feedback [6] (+) shared reflection for learners [3, 5, 6, 9] (+) high quality of facilitation [5, 9] (-) lack of adequate supervision/ support [8]
<i>E-Learning</i>	(+) learning in a non-threatening environment [2] (+) learning at their own time; asynchronous aspect [2, 5]
<i>Continuing education</i>	(+) faculty development programs [1, 5, 8, 10] (+) educational theory linked to supporting collaborative social learning [5]
<i>Specific approaches IPE teaching-learning methods</i>	
<i>Theory-based learning</i>	(-) IPE teaching through lectures [9] (-) teacher who just transmits knowledge [9] (-) sub-optimal IPE – teaching that not represent clinical settings [2]
<i>Exchange-based Learning</i>	(+) stimulating collaboration and teamwork [9] (+) face to face small group learning activities [9] (+) learn about roles [9] (+) panel discussion with IP team practitioners [9]
<i>Simulation-based learning</i>	(+) support for IPE matched to clinical reality [9] (+) involvement of (simulation) patients in IPE lessons [9] (+) participate in case scenarios in small groups [2] (+) self-efficacy and understanding of others' professional role [9] (+) value in the discussions during the simulation [4] (+) increased team learning [4] (+) improved interprofessional communication [2, 9] (+) building positive relationships [2] (+) benefit of being an observing participant [4] (-) lack of simulation knowledge [4] (-) lack of faculty expertise in technology [4]
<i>Action-based learning</i>	(+) real cases [9] (+) scenarios as learning material for discussion [7] (+) problem-based learning [9] (+) complete root cause analysis and develop recommendations [9]
<i>Practice-based learning</i>	(+) authenticity of the context [9] (+) real cases for clinical practice [7] (+) identify the roles of other professions [9] (+) promoted interaction in a non-threatening environment [2] (+) created a lasting impression [3] (-) lack of adequate supervision/ support [8]

Legend:[1] Lawlis et al., 2014; [2] Madisa et al., 2022; [3] McNaughton, 2018; [4] Palaganas et al., 2016 [5] Reeves, Fletcher et al., 2016; [6] Reeves, Pelone et al., 2016; [7] Riskiyana et al., 2018; [8] Sunguya et al., 2014; [9] Visser et al., 2017; [10] Watkins et al., 2016. (-) barrier; (+) facilitator; (0) barrier or facilitator, depending on the context. IPE = Interprofessional Education



competencies (McNaughton, 2018). Real-world practice promoted interaction, strengthened team cohesion and enriched experiential learning, and in this way it facilitated the exchange of experiences among learners, often making them feel empowered to participate in interprofessional learning (Madisa et al., 2022). The practice became a barrier, however, when there were contradictions between the values taught in education and the values practiced and experienced in real-world settings. This was often observed in clinical settings where interprofessional practice (IPP) had not yet been integrated into daily practice (McNaughton, 2018; Visser et al., 2017).

In addition, learning should be self-directed (Visser et al., 2017) and structured to address the relationships and processes of interprofessional teamwork (Madisa et al., 2022; McNaughton, 2018; Riskiyana et al., 2018; Visser et al., 2017). For example, training in team communication skills acted as a facilitator by increasing overall motivation, positive attitudes towards interprofessional team communication, and perception of the benefits of IPE (Visser et al., 2017). Combining different teaching and learning methods was also found to be beneficial (Madisa et al., 2022; Riskiyana et al., 2018). In contrast to that, a siloed, monoprofessional teaching approach was seen as a barrier (Sunguya et al., 2014). Developing and assembling suitable interprofessional learning materials, especially for a group of learners who were initially not accustomed to working together, posed challenges (Riskiyana et al., 2018; Sunguya et al., 2014).

The category of “supportive tools” encompassed various measures that were identified as generally beneficial for the implementation of IPE. Creating a motivating environment with incentives for learners was found to be useful. Establishing a safe and positive learning climate was also found to be important (Madisa et al., 2022; Reeves, Fletcher, et al., 2016; Visser et al., 2017). IPE thrives on diversity, so students found it helpful when educators originated came from their own background, but also from other health professions (Visser et al., 2017). Therefore, a teaching team should incorporate interprofessional members (Madisa et al., 2022; Reeves, Fletcher, et al., 2016; Visser et al., 2017). Feedback and reflection were identified as notable supportive tools (McNaughton, 2018; Palaganas et al., 2016; Reeves, Fletcher, et al., 2016; Reeves, Pelone et al., 2016; Visser et al., 2017). These processes helped students learn about their own profession and the professions of others (McNaughton, 2018). Reeves, Fletcher, et al. (2016) even found that feedback given and guided by the instructor was more effective than self-directed learning. This highlights the crucial influence of the facilitator in ensuring effective interprofessional interactions.

The use of e-learning as a method offered several advantages, such as allowing participants to engage in learning on their own time and in a non-threatening environment (Madisa et al., 2022; Reeves, Fletcher, et al., 2016). Visser et al. (2017) found that students perceived small group discussions online as redundant however, when they were combined with face-to-face small group learning. Direct interaction was preferred in this context. Faculty training programs related to IPE approaches have proven beneficial for enhancing their skills and knowledge (Lawlis et al., 2014; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Watkins, 2016).

Specific approaches IPE teaching-learning methods

An evaluation of specific approaches to IPE teaching and learning methods was conducted based on Barr’s (2018) typology of learning methods. Sottas et al. (2016) utilised this typology to classify IPE learning methods for the German-speaking context and added the theory-based learning method to the original classification (see Table 4). It should be noted that observation-based learning was not mentioned in the reviews, and therefore this category is not listed.

Theory-based learning, which is solely focused on knowledge transmission through lectures o that lacks practical relevance, was considered unsustainable (Madisa et al., 2022; Visser et al., 2017). According to Sottas’s definition, exchange-based learning includes debates, case discussions, problem-solving, and workshops. In this context, learning activities that foster collaboration, teamwork, and participants’ understanding of each other’s roles were found to be beneficial (Visser et al., 2017). This teaching method was particularly effective when organized in small groups (Visser et al., 2017).

Simulation-based learning involves longer role-playing scenarios, especially when using simulation mannequins or actors (Sottas, 2016). In order for this method to be enriching, however, it needed to reflect clinical reality in a protected setting (Palaganas et al., 2016). Even taking an observational role in the simulation process, combined with debriefing and reflection, was regarded as positive (Palaganas et al., 2016). The use of simulation-based learning also significantly increased teamwork skills (Palaganas et al., 2016). Simulated actions also enhanced self-efficacy, interprofessional communication, and understanding of others’ professional roles (Palaganas et al., 2016; Visser et al., 2017). The lack of expertise among instructors in the methodology and technology of simulation was reported as a barrier (Palaganas et al., 2016). Action-based learning integrates problem-based and case-based learning, both of which were considered beneficial (Riskiyana et al., 2018; Visser et al., 2017).



Practice-based learning involves practical interprofessional exercises in a realistic work environment (Sottas et al., 2016). Learners regarded this teaching method as the most sustainable approach, because practical interactive experiences left a more lasting impression (McNaughton, 2018). The approach was particularly valued when the authenticity of the context was present, such as using real cases from clinical practice (Riskiyana et al., 2018; Visser et al., 2017). These practical exercises helped learners recognize the roles of other professional groups and generally promoted interaction within a safe space (Madisa et al., 2022; Visser et al., 2017). The effectiveness of this teaching approach was diminished, however, when there was a lack of adequate supervision (Sunguya et al., 2014).

IPE-related influencing factors: Institution

In this main dimension, all influencing factors related to institutional conditions were summarized. A primary focus was set on the structures and the organization of interprofessional education (IPE). Three categories were identified: resources, organizational structures, and implementation (see Table 5).

Resources

The first category, “resources,” includes the subcategories of finances, time, rooms/equipment, personal, and management. It is generally accepted that the presence of these resources is beneficial for IPE, while their absence or deficiency is considered hindering. Specific conditions within these subcategories were summarized to determine how they function as either resources or barriers. The provision of financial resources, both through internal and external funding, was identified as an important source of the support development and evaluation of IPE (Lawlis et al., 2014; Reeves, Fletcher, et al., 2016). Financial barriers included inconsistent salaries, a lack of financial incentives for staff participation in IPE activities, and competition between academic faculty and programs for funding (Lawlis et al., 2014; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014).

The factor of time was crucial in all three main categories (see Tables 3-5). In the context of the organization, flexible schedules were found to be beneficial for scheduling IPE interventions (Madisa et al., 2022). However, time management was identified as a challenge due to diverse and complex timetables and varying program calendars (Lawlis et al., 2014; McNaughton, 2018; Sunguya et al., 2014). Institutions that failed to provide adequate time resources saw a negative impact on IPE, both in the planning and implementation phases (McNaughton,

2018; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017).

The availability of well-resourced IPE rooms was considered beneficial, in particular the presence of simulation facilities (Madisa et al., 2022; Palaganas et al., 2016; Sunguya et al., 2014). The subcategory of equipment issues included difficulties with audio recording, live streaming, and/or electronic failures of simulation mannequins (Reeves, Fletcher, et al., 2016). Another challenge was the logistics of the locations where IPE activities took place (Sunguya et al., 2014). Many existing facilities, exacerbated by larger numbers of participants compared to mono-professional activities, posed a barrier due to insufficient room capacity for large groups (McNaughton, 2018; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014).

Teaching staff were more inclined to engage in IPE instruction when there were opportunities for regular planning and discussion among educators, when they were compensated for IPE training, and when online resources for teacher education were provided (Madisa et al., 2022; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014). Limitations in the resources provided to facilitators were identified as barriers (Sunguya et al., 2014). There was a clear need for additional personnel, and the workload imposed by management was considered too high (Lawlis et al., 2014; Sunguya et al., 2014).

In terms of management and leaders, the reviews identified a lack of staff development plans related to IPE and insufficient conceptual and institutional support as barriers (Madisa et al., 2022; Lawlis et al., 2014; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014). Once this support was available, the engagement of institutional management at all levels was crucial for the successful implementation of IPE initiatives (Madisa et al., 2022; Reeves, Fletcher, et al., 2016). The presence of a shared interprofessional vision among staff was also found to be beneficial (Lawlis et al., 2014).

Organizational structures

The second category, “organizational structures,” was examined in terms of curricular structures and process structures. The subcategory of curriculum encompassed all factors related to the curriculum of IPE, including both academic curricula and continuing education in practical training settings. It was found that solid integration, consideration of an overarching framework, and the implementation of a longitudinal, structured curriculum with progressive IPE competencies, were beneficial (Madisa et al., 2022; Riskiyana et al., 2018; Sunguya et al., 2014; Visser et al., 2017). The alignment with existing interprofessional competency standards



Table 5: Overview of IPE influencing factors from the perspective of the institution.

Dimension	Identified influencing factors institution in IPE
Resources	
<i>Financial</i>	(+) external / internal funding [1, 5] (-) different funding and competition [1, 8] (-) lack of financial incentives [1, 5, 8] (-) successfully sustain IPE activities within normal budgets [5] (-) differential salaries [8]
<i>Time</i>	(+) flexible schedule; spread over time [2] (-) lack of allocation of time resources [3, 5, 8, 9] (-) different timetables and complex schedules [1, 3, 8] (-) varying program calendars [1, 8] (-) lack of time for implementation of IPE [1, 3, 5, 8]
<i>Rooms/ Equipment</i>	(+) well-resourced rooms [2, 8] (+) physical space designated for simulation [2, 4] (-) lack of classroom space [3, 5, 8] (-) logistics of the location [8] (-) equipment issues [5]
<i>Personnel</i>	(+) regular planning and discussion between facilitators [5] (+) remuneration for IPE faculty training [2] (+) providing online resources for faculty training [8] (-) limited faculty resources [8] (-) high workloads placed upon staff by management [1, 8] (-) poor attendance of medical staff [8] (-) require more staff [8]
<i>Management</i>	(+) support through management and leaders [1, 2, 5] (+) shared interprofessional vision by staff [1] (-) lack of (conceptual) support from management [2, 5, 8] (-) limited availability of staff development programs [1, 8]
Organizational structures	
<i>Curriculum</i>	(+) well integrated with the curricula [2, 8, 9] (+) longitudinal, structured setting/curriculum of IPE [2, 3, 7, 9] (+) referral to a specific standard/framework of competence for IPE [4, 7] (-) various accreditation demands [1, 8] (-) integrating IPE into curriculum of different institutions [3, 8] (-) no underlying principles of competency framework [8] (-) predominantly siloed, content-heavy monoprofessional curricula [1, 3, 8, 9]
<i>Processes</i>	(+) structured IPE programmes [2] (+) development of appropriate organisational structures [1] (+) flexibility (interprofessional e-learning the asynchronous aspect) [5] (-) contrasting systems and teaching processes [8] (-) lack of central planning [8] (-) clashes with profession-specific learning activities [5] (-) coordinating students and teachers from different units [8] (-) large number of students [5, 6, 8]
Implementation	
<i>Planning</i>	(0) different conceptualizations of IPE (top-down vs. student centered IPE) [8] (0) selection of appropriate level of study among students [8] (+) face to face small group learning activities [9] (+) combining learning methods [2, 7] (+) providing electronic resources such as cases or simulations [8] (-) complexity of the learning topic [7] (-) difficulty meeting needs of all disciplines [4] (-) adaption to learners needs [5] (-) dissonance between stated faculty values and educational practice [3, 9] (-) lack of access, structure or continuity to (interprofessional) placements [3, 8]
<i>Performance</i>	(+) collaboration and shared commitment of stakeholders [1] (+) wearing a uniform [9] (-) difference in personal objectives of the involved educators [4] (-) high learning load [8] (-) lack of enough time [1, 2, 3, 5, 8, 9]
<i>Evaluation</i>	(+) providing standardized assessment tools [8] (+) progress of IPE and the positive results [8] (-) lack of assessment [4, 8, 9]

Legend: [1] Lawlis et al., 2014; [2] Madisa et al., 2022; [3] McNaughton, 2018; [4] Palaganas et al., 2016 [5] Reeves, Fletcher et al., 2016; [6] Reeves, Pelone et al., 2016; [7] Riskiyana et al., 2018; [8] Sunguya et al., 2014; [9] Visser et al., 2017; [10] Watkins et al., 2016. (-) barrier; (+) facilitator; (0) barrier or facilitator, depending on the context. IPE = Interprofessional Education



for IPE also provided support (Palaganas et al., 2016; Riskiyana et al., 2018). Challenges arose from differing accreditation requirements for IPE, including workload, teaching formats and examination requirements (Lawlis et al., 2014; Sunguya et al., 2014). The predominantly siloed structures of education, with already content-heavy curricula, also hindered the development of IPE curricula (Lawlis et al., 2014; McNaughton, 2018; Sunguya et al., 2014; Visser et al., 2017). Furthermore, integrating IPE into different institutions proved to be difficult when there was a dissonance between the values taught in IPE and the values practiced in real-life settings (McNaughton, 2018; Sunguya et al., 2014). This barrier was evident, for example, in the selection of internship placements.

To positively influence IPE processes, a structure, or the development of structures, was identified as essential (Lawlis et al., 2014; Madisa et al., 2022). If processes could be made more flexible, as seen in asynchronous events, this could facilitate the implementation of IPE (Reeves, Fletcher, et al., 2016). In contrast, inconsistent and conflicting curricula and course schedules, as well as the lack of central planning, hindered the IPE processes (Sunguya et al., 2014). Coordination of this specific learning group proved to be challenging in the IPE process. Barriers arose due to the large number of learners and the fact that educators and learners came from different disciplines, often resulting in overlaps with profession-specific learning activities (Reeves, Fletcher, et al., 2016; Reeves, Pelone et al., 2016; Sunguya et al., 2014). Interestingly, these barriers could be tempered depending on the resources provided, such as management support (Madisa et al., 2022; Reeves, Fletcher, et al., 2016).

Implementation

The final category, implementation, included the subcategories of planning, implementation, and evaluation. Within this category the interdependence and close interlocking of the influencing factors becomes apparent. Many factors that were already crucial for the curriculum were also considered as influencing factors in the planning of IPE. The same can be said about influencing factors in terms of learning methods (Madisa et al., 2022; McNaughton, 2018; Palaganas et al., 2016; Reeves, Fletcher, et al., 2016; Reeves, Pelone et al., 2016; Riskiyana et al., 2018; Sunguya et al., 2014; Visser et al., 2017). The influence factor of the teachers and the lack of time resources were very significant to implementation (Lawlis et al., 2014; Madisa et al., 2022; McNaughton, 2018; Palaganas et al., 2016; Reeves, Fletcher, et al., 2016; Reeves, Pelone et al., 2016; Riskiyana et al., 2018; Sunguya et al., 2014; Visser et al., 2017). To effectively evaluate IPE, the availability of standardized assessment tools was necessary (Sunguya

et al., 2014). IPE had a particularly sustainable impact when the progress resulting from IPE was made visible and positive evaluation outcomes were achieved. This underscored the importance of evaluation for the long-term and sustainable learning benefits of IPE (Sunguya et al., 2014).

DISCUSSION

The reviews included in the study revealed a broad spectrum of influencing factors in the field of interprofessional education ([Appendix 2](#)). Studies from eight different countries and different contexts around the globe were analysed. This brought together a wide range of challenges and opportunities in IPE. It is crucial to consider these influencing factors in their interrelationship with each other. During the analysis, various barriers and facilitators were identified, distributed across three interrelated dimensions: Learners, teachers and institutions. In the narrative synthesis, we formed categories through a combination of inductive and deductive approaches. On one hand, we used an inductive approach by identifying barriers and facilitators within the same thematic framework. On the other hand, we employed a deductive approach by incorporating existing structures from the literature, such as specific IPE methods. In this way, a new model with the three interrelated dimensions of influencing factors for IPE was developed (Figure 2).

Many of the influencing factors were found in multiple reviews. However, they should not be weighted, as each factor needs to be considered within its contextual web. It became evident that the factors within the three main dimensions are interdependent and mutually influence each other. The dichotomous nature of influencing factors could lead to their classification as either barriers or facilitators, depending on the perspective from which they were considered. For example, a lack of role clarity was identified as a barrier, but became a facilitator when successful role clarity was a focal point. The compilation of these influencing factors provided valuable insights into areas where improvements and significant changes in IPE are needed. The interdependence between the different dimensions will be discussed, with suggestions for further research made.

Learners

In the dimension of learners, Reeves, Fletcher, et al. (2016) noted a lack of clarity regarding how demographic factors contextually influence IPE programs. Overall, the literature pays little attention to the composition of groups in IPE, especially when learners collaborate in small groups or what happens when different demographic



characteristics converge. Discrepancies in age structures were found to have a negative impact on collaboration, as well as clinical experiences that were associated with negative experiences related to hierarchies or status (Reeves, Fletcher, et al., 2016; Sunguya et al., 2014). One possible explanation for why younger students tend to assess their interprofessional relationships more positively is that, due to their shorter biographies, they have less experience compared to older learners. Consequently, the opportunity for them to accumulate negative experiences has been relatively limited (Reeves, Fletcher, et al., 2016). Appelbaum et al. (2019) found that successful team cohesion and a sense of psychological safety (i.e., the belief that one can voice their opinion without fearing negative consequences) significantly influence team effectiveness. Future studies should therefore further investigate demographic factors such as age, gender, and cultural aspects (e.g., profession, status) as they affect group composition in IPE, as well as their impact on team cohesion.

IPE is significantly shaped by diversity. According to Gilbert (2005), interprofessional education teams in healthcare should not be defined by the nature or diversity of their professional composition, rather by the quality of their communication and the degree of collaboration, but this very diversity poses a challenge in IPE (Mitchell et al., 2011).

Diversity in interprofessional teams arises primarily from how the interprofessional groups are composed. It emerges from the variety of professions coming together, resulting in differences in learning levels, knowledge bases, learning needs, learning experiences, learning styles, and professional jargon. All these aspects have been identified as challenges, but they are precisely what characterize interprofessional teams later on. Various research groups emphasize that when a highly diverse interprofessional group collaborates effectively, they reach better decision-making, as well as more innovative and creative approaches to problem-solving (Dunn et al., 2018; Mitchell et al., 2011; Reinders & Krijnen, 2023). The diversity within interprofessional teams and learning groups, along with the associated differences in opinion, are central to the added value of interprofessionalism (Mitchell, 2021). In this context, diversity in its various dimensions should be considered as a variable that can have a positive or negative impact on the functioning of groups. Mitchell et al. (2011) found that diversity and team efficiency are related, and that these aspects influence the dimension of “team belongingness.” Therefore, in IPE teaching, the construct of diversity should be addressed, team efficiency should be emphasized as a steering factor, and learners’ sense of “team belongingness” should be strengthened. The relationships between these factors should be further explored in depth.

Another aspect of how diversity influences team efficiency can be found in the constructs of social identity theory and social categorization (Mitchell et al., 2011; Reinders & Krijnen, 2023). Social groups categorize themselves based on perceived similarities and differences among their members and define their affiliations as belonging to either the in-group or the out-group (Hean & Dickinson, 2005). This process of self-categorization forms the basis for bias, differentiation and the formation of prejudices (Burford, 2012; Willetts & Garvey, 2020). In the practice of interprofessional collaboration, this professional stereotyping plays a negative role and hinders the ideals of IPE (Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017). Processes and mechanisms that mitigate these stereotypes should be integrated into education to promote a sense of belonging to the interprofessional team as the favored group and can thereby strengthen interprofessional identity. There should be sufficient space and time for team-building activities in the teaching-learning concepts (Madisa et al., 2022; Riskiyana et al., 2018). The process of self-categorization should be focused on commonalities and their benefits within the interprofessional learning group. With adequate time resources dedicated to it, it strengthens relationships and interactions among group members. Recognizing the values, skills, and personality traits within the group has a profound influence on how teams operate (Bell et al., 2018). The promoting factor of sufficient time should be intentionally incorporated into interpersonal relationships, allowing learners to become familiar with each other and providing ample time for informal learning. All this supports the importance of belongingness to the interprofessional team and contributes to the dismantling of hierarchies and differences in status (Madisa et al., 2022; Reeves, Fletcher, et al., 2016; Sunguya et al., 2014; Visser et al., 2017). Perhaps the integration of interprofessional competencies in the more recent curricula of health professions is partly responsible for the more positive ratings of interprofessional relations in younger people. In summary, for learners, interacting demographic factors such as age, gender, and cultural differences in the context of group composition and diversity need to be further investigated. New insights from these variables should be deliberately applied as promoting factors in IPE. Also, a sense of belonging in interprofessional teams is identified as an important positive influencing factor. Further research is needed to understand the related factors that strengthen interprofessional identity in IPE.

Educators

The competence of educators was identified as a significant component by practically all the included



reviews (Lawlis et al., 2014; Madisa et al., 2022; McNaughton, 2018; Palaganas et al., 2016; Reeves, Fletcher et al., 2016; Reeves, Pelone et al., 2016; Sunguya et al., 2014; Visser et al., 2017; Watkins et al., 2016). The profile of requirements for IPE educators, as derived from the reviews, was complex. Educators should serve as role models, possess a non-frontal teaching style that invites enthusiasm and empathy, and consider diversity appreciatively. They should promote group processes, accompany learners, and facilitate meaningful reflections. They should also possess multiple teaching methodologies, and be able to combine them and collaborate with colleagues from other professions to develop effective interprofessional teaching and learning materials. The World Health Organization (WHO, 2010) has also previously set similar requirements for IPE educators.

However, according to current research, only a minority of educators meet such a profile. Watkins (2016) focused extensively on the development of training programs for IPE educators. Interestingly, many similarities emerged between the influencing factors that were identified for learners and the factors influencing educators' learning. Educators had to recognize their roles as professional participants in IPE faculty development, but also their changing roles in collaborative teams. Competent moderators who employed teaching methods such as reflection and self-experience facilitated knowledge acquisition. In summary, Watkins (2016) concluded that educators became competent IPE educators when they were taught in the same way they would later teach IPE. The ideal composition of the teaching staff should also reflect the diversity of the learners. In this way the teaching team can serve as a model for successful IPE.

The identified overarching approaches of IPE teaching and learning methods embody three important aspects of interprofessional collaboration. First, there is a patient-centered approach (Madisa et al., 2022; McNaughton, 2018; Sunguya et al., 2014). Such an approach is also recognized as an important domain in international interprofessional competency frameworks (IPEC, 2016; Canadian Interprofessional Health Collaborative, 2010). Accordingly, here the client and their concerns and wishes are at the center of the collaboration. The main aim is always to collectively achieve the client's individual goals to the best of each individual's ability.

Secondly, there is a team-based approach, focusing on collaboration and promoting team-building activities (Madisa et al., 2022; McNaughton, 2018; Riskiyana et al., 2018; Sunguya et al., 2014; Visser et al., 2017). The recommendations of the international competency frameworks for this approach align with the promoting factors that we identified (IPEC, 2016; Canadian Interprofessional Health Collaborative, 2010).

Thirdly, there is experiential and practice-based learning (Madisa et al., 2022; McNaughton, 2018; Riskiyana et al., 2018; Visser et al., 2017). There are still barriers, however, to implementing interprofessional activities in the clinical context (Schot et al., 2020). The significant benefits of practical experience for learners may fade if the concept of interprofessional collaboration is not firmly embedded in real-world practice. Without an interprofessional orientation in practice, practical experiences can impart negative effects. Although practice-based learning through clinical placements holds a high value, there is still research that needs to be done about the successful implementation of IPE in a practical setting (Schot et al., 2020).

The aspects identified as supportive tools are not really specific to IPE and generally apply to promoting learning, such as reflection or creating a safe and positive learning environment (Robertson et al., 2022). Despite the advancing digitization, e-learning was rarely mentioned as a teaching design for IPE in the reviews, or was even described by learners as unnecessary when face-to-face options were available, as seen in Visser's study (2017). One possible explanation is that later collaboration also takes place face-to-face. It is important to consider that most studies were conducted before the COVID-19 pandemic. At that time, e-learning was still a relatively innovative and unfamiliar medium. One consequence of COVID-19 is that the use of and familiarity with e-learning formats has increased (Kaap-Fröhlich et al., 2022).

Different types of e-learning methods were reported, such as online/web-based programs, tele-education, mobile app, and massive open online courses (MOOC). Successful e-learning provided interactive and authentic learning experiences that promoted direct clinical applications (Zhang et al. 2023). Potential benefits of integrating e-learning in IPE are particularly seen in the implementation of IPE in rural areas or outpatient settings (Kaap-Fröhlich et al., 2022).

Another option is a blended learning format that combines elements of online-based self-study and project work with face-to-face learning (Kerres & Witt, 2003). This format could reduce organizational and planning effort, as well as the resulting difficulties in scheduling IPE learning groups. It should be emphasized that the studies identified practical experience and direct contact through face-to-face phases as irreplaceable. However, e-learning formats should be considered in evaluation studies of IPE programs, and their potential for teaching and practice should be further investigated.

Furthermore, combining various teaching and learning approaches supports interprofessional interaction and helps maximize interprofessional collaborative learning (Madisa et al., 2022; Riskiyana et al., 2018). Applying



diverse teaching strategies, such as simulation-based learning, small- group learning, reflective learning, and practical experiences with clinical situations, as well as different combinations of all of these, leads to greater development of interprofessional competencies (Madisa et al., 2022). Lectures should be avoided in IPE teaching (Visser et al., 2017). In summary, the more practice-oriented the interprofessional teaching becomes, the more potential for advancement it receives, as it serves as a true catalyst for interprofessional collaboration (Jones et al., 2022; Sottas et al., 2016).

Institutions

The mechanisms described in the WHO Framework for Action on Interprofessional Education and Collaborative Practice (2010) should support the implementation of IPE. On one hand, there are mechanisms for educators to consider, such as institutional support and training. On the other hand, curricular mechanisms like principles of adult education, logistics and planning, as well as the content of the IPE programs, should be taken into account. These mechanisms continued to find their relevance as influencing factors in the dimension of institutions in the included reviews. A major challenge lies in traditional mono-professional educational structures, where content-heavy curricula and complex planning logistics hinder the integration of IPE. Overcoming these difficulties largely depends on the provision of institutional resources.

In order to establish sustainable IPE programs, faculty development, supported by all stakeholders, is crucial. Notably, the endorsements of management and leadership play a significant facilitating role (Madisa et al., 2022; Reeves, Fletcher, et al., 2016). According to the position paper formulated by the GMA committee for German-speaking countries, faculty development is seen as one of the specific core requisites for IPE, alongside legal frameworks and networks (Kaap-Fröhlich et al., 2022). Interprofessional executive leadership should create flexible structures and allocate time for implementation, and educators should be prepared for their roles through training (Kaap-Fröhlich et al., 2022). An institutional interprofessional vision should be developed and pursued. Educational programs should be aligned with existing interprofessional competency standards and curricular integration should be supported by a longitudinal, structured IPE curriculum that aligns with interprofessional practice. Also, from an international perspective, as outlined in the CAIPE strategy for 2022-2027, faculty development plays a pivotal role in providing essential support to institutions in departmental, curricular, and assessment-related matters [<https://www.caipe.org/strategy>].

The need for change in systems (in education and healthcare) has been emphasized since the Lancet Report (2010). As a key component in transforming the educational system, generating funding and resources for faculty development, organizational processes, and personnel training at the institutional level are crucial. Concerning IPE, initial regulations should establish interprofessionalism through the inclusion of education and examination regulations – for example, in nursing professions (Bundesministerium der Justiz, 2018). or in the national competency-based learning objective catalogue for medicine (NKLM 2.0). Legislative and political initiatives should support the integration of interprofessional education, and training programs for IPE educators should be established. In summary, management and leadership need to create structures and processes that allow for the sustainable implementation of IPE and have a positive impact on educators and learners.

Limitations

One significant strength of the present umbrella scoping review lies in the literature search and data analysis. The creation of a search protocol allows for comprehensive transparency and traceability of the search process. Two reviewers conducted the screening procedure and subsequent qualitative narrative synthesis. As is common in qualitative analyses, a certain level of subjectivity in category formation cannot entirely be eliminated. To mitigate this, the heterogeneity of the reviewers in terms of age, profession, and teaching/practice experiences was considered.

Nevertheless, our methodological approach of inclusion and exclusion criteria can be discussed. During the search process, studies evaluating the effectiveness of IPE programs and/or knowledge gain through the IPE program were intentionally excluded. These effectiveness studies measured outcomes in terms of enhancements in students' knowledge, skills, attitudes, or the learning outcomes resulting from IPE. In this umbrella review, the emphasis was placed on understanding the contributing factors to IPE, which is why these studies were excluded. Thus, it is possible that studies relevant to our research objective were excluded by our methodological approach. However, it is not entirely ruled out that other reviewers may arrive at slightly different results following the data analysis. Additionally, the search was limited by excluding grey literature and including only English, German, and Dutch-language articles published between 2014 and 2022. Consequently, further potential IPE studies may have been overlooked, while others of relevance were not integrated due to the chosen methodological procedure.



Conclusion

The qualitative narrative synthesis of the ten included reviews revealed three main dimensions: learners, educators, and institutions. The resulting model illustrates the mutual dependency of the influencing factors in IPE to health professions in general. The tables that have been created for each main dimension, along with their identified influencing factors, can be used as indicators to identify areas for improvement and potential changes in IPE. However, influencing factors for IPE should always be considered in their interdependence and not as individual independent factors. In particular, expanding support from management and leadership, along with the implementation of effective faculty development concepts, is crucial. Further research is needed to gain a deeper understanding of the constructs and their relationships between diversity, team efficiency, and the development of interprofessional identity in the context of IPE.

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Ethical approval

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Conflict of interest

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