SCOPING REVIEW

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Factors to consider in planning a tailored undergraduate interprofessional education and collaborative practice curriculum: A scoping review

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ABSTRACT

Background: Heath care students need to be practice-ready at qualification. Increased interest in and drive towards more collaborative practice necessitate consideration of teaching and learning factors unique to learning settings, to plan a tailored interprofessional education and collaborative practice curriculum, based on empirical findings.
Method: The Joanna Briggs Institute's scoping review methodology guided this study. Eight online databases were searched, with 72 articles included for full review. Charted data, analysed quantitatively, included year, context, study design and population. The four-dimensional curriculum framework model, consisting of future health care needs, interprofessional competencies, methods of teaching and institutional support, directed the deductive analysis.
Results: Interprofessional education is best presented as a tailored curriculum, i.e. fitting the specific institution's needs, based on formal rather than a voluntary participation and presented longitudinally. Buy-in from institutional management assists in overcoming barriers related to resourcing and staff participation.
Conclusion: Successful interprofessional education and collaborative practice curricula are dependent on an interplay of various factors such as specific professions involved, future healthcare needs of the country, expected capabilities and competencies of graduates, content and teaching methods, and available resources. Facilitators, as well as policymakers of academic and clinical institutions, could benefit from the synthesized evidence.

Keywords: interprofessional learning, pre-licensure, Joanna Briggs, four-dimensional curriculum model, graduate competencies

INTRODUCTION

The increasing complexity of patients' needs has influenced health professional education and health policy and as a result, has strengthened a drive for preparing a "collaborative practice-ready" health workforce to respond to local health needs[1]. Despite well-evidenced advantages of Interprofessional Education and Collaborative Practice (IPECP), the continued lack of implementation as part of undergraduate curricula, may be related to limited attention to factors that influence planning of a tailored IPECP curriculum. This scoping review initiated a research process for planning a university specific IPECP programme in South Africa.

Literature describing IPECP curriculum planning in Africa is limited. A variety of published documents, e.g., interprofessional education and practice guides and competency frameworks from different countries, such as, Australia[2], USA[3] and Canada[4], are available. However, despite the value of competency frameworks and practice guides for curriculum planning, these guides have a limited evidence base and mostly rely on field experts' experience[5].

Most models guiding curriculum development either use a linear approach or do not explicitly address IPECP competencies e.g., Kern curriculum design model, Context, Input, Process and Product (CIPP model), Biggs model[6]. In contrast, the four-dimensional curriculum framework (4DF) was specifically developed for IPECP[7]. The scope of the 4DF allows curriculum planners to shape the IPECP curriculum, offering the most comprehensive learning activities[8]. Although the 4DF has been applied in a range of studies[9,10], none indicated its use to develop a tailored IPECP curriculum.

When a university plans an IPECP programme, the unique context and how it differs from what available literature describes, should be considered. The 4DF guides tailored curriculum development to include (1) health care needs and available resources; (2) application of IPECP competencies; (3) teaching, learning and assessment variations; (4) institutional support and available resources.

The African context has unique challenges related to healthcare needs of the population and in equitability of available resources to ensure quality of life. In addition, within South Africa, implementation of IPECP programmes differ vastly due to lack of clear policy, differing IPECP competency applications and the level of commitment by university management. For example, health profession accreditation bodies or councils e.g., the Health Professions Council of South Africa[11], expect universities to include interprofessional education in their curricula. However, when professional accreditation bodies do not apply uniform guidelines on how IPECP should be incorporated into curricula of different professions, it causes additional challenges for planners of IPECP curricula that deals with a large variety of professions[9].

The scoping review forms part of the first author's PhD study aimed at developing an IPECP module for final year health care students at a South African university. The objective of this review was to identify the factors that affect planning of a tailored undergraduate IPECP curriculum by identifying, analysing, and synthesising relevant articles.

METHODOLOGY

The five-step Joanna Briggs[12] scoping review method was followed:

Stage 1: Identifying the research question

The research question was: *What is known, from the published, peer-reviewed literature about the factors that influence the planning of a tailored IPECP curriculum for health care professionals?*

Stage 2: Identifying relevant articles

A search strategy including seven databases (MEDLINE, CINAHL, Science Direct, PubMed, NexusIPE, Scopus) as well as Google Scholar search engine identified articles in English between 2009 and 2020. The Boolean search phrases were:

- "Interprofessional education" AND "Collaborative practice" AND/OR "Interprofessional learning"
- "Planning" OR "Development"
- "Undergraduate students" OR "Undergraduates" OR "Pre-Qualification students" OR "pre licensure"
- "Curriculum" OR "Programme" OR "Module"

The articles reviewed included: participants who were undergraduate students enrolled in a health care professional programme, as well as course developers, and experts in IPECP. The included article context focused on curricula delivered at universities in classrooms clinical settings, and in urban or rural areas. Articles published globally were considered. Inclusion criteria for concepts covered "interprofessional education", "interprofessional learning" and/or "collaborative practice".

Initial exclusion criteria were studies that focused on single activities (e.g., oncology ward rounds), postgraduate students, qualified health care professionals, and non-health care professional students.

Stage 3: Study selection (please refer to PRISMA guide, Figure 1, page 80)

Selection was based on initial screening by title (n = 25704), then abstract (n=1324) and lastly full text (n=72). Two team members reviewed the articles and referred any disagreements to a third reviewer for the final decision for inclusion[12]. The search strategy was refined after the initial research yielded a large number of articles. One of the main additional inclusion criteria added is that only empirical research articles in peer-reviewed journals were included. After initial screening it was decided that all articles based on secondary data with no evidence (e.g., guidelines) as well as literature summaries (as these could have been based on primary articles) were also excluded. Seventy-two articles were included and analysed. Figure 1 (page 80) summarises the study inclusion process after applying the refined inclusion criteria.

Stage 4: Charting the data

The author/s, publication year, title and journal information, country (study location), context (university or clinical setting), research method/study design, study population

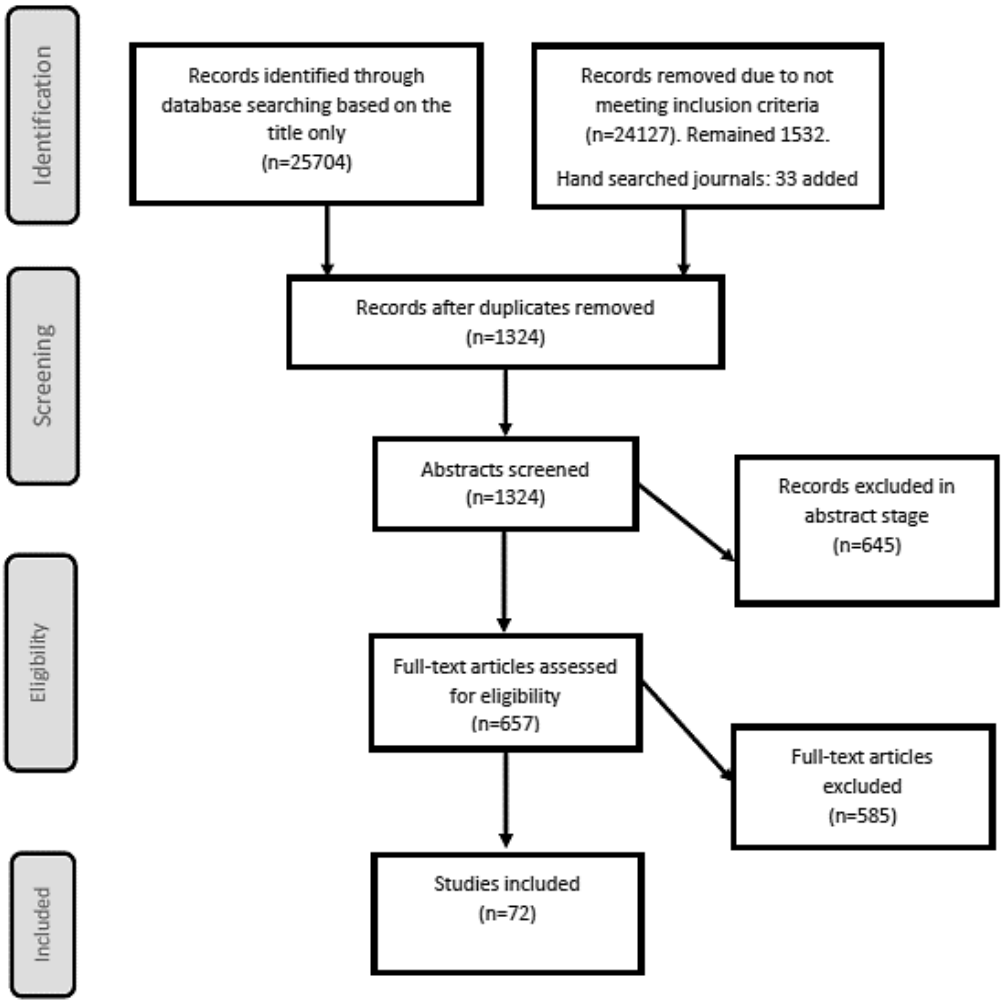

Figure 1: PRISMA flow diagram for scoping review.

(e.g., students or experts, their level as juniors/seniors, their professions), were charted using Microsoft Excel. See addendum A.

Stage 5: Collating, summarising, and reporting the results

Quantifiable data were analysed descriptively, and a deductive qualitative thematic analysis based on the 4DF7 directed the thematic analysis. For included articles please refer to addendum A, page 88.

RESULTS

Quantitative data are presented in a narrative descriptive format. (The included articles are identified with an asterisk* in the reference list.)

Descriptive summary of demographic information

Participants: Of the 72 articles reviewed, 15 (20.8%) included key role players, e.g., IPECP experts, or course developers as participants. The remaining 57 (79.2%) of articles consisted of students as participants.

Course progression: Twenty-eight (49%) of the 57 articles that focused on students indicated that senior students participated, 16 (28%) focused specifically on first year students, and 13 (23 %) did not specify the year group of participants.

Professions: Nursing was the most represented profession with 42 (58.3%) studies followed by physiotherapy and medicine with 28 (38.8%) each, and occupational therapy and pharmacy with 26 (36%) each. A variety and different combinations of professions participated, from at least two up to 10 professions per session. The most frequent number of professionals included in a session were six as mentioned in 47 studies (65.3%), followed by five professions mentioned in 9 studies (12.5%) and three to four professions mentioned in eight studies each (22.2%).

Number of participants: A vastly different number of students were included in IPECP sessions, ranging from less than a 100 to 1 873 students. Not all studies mentioned the number of students. Of the 46 studies (64%) where the number of participants was stated, most studies, 24 (52.2%) reported on participation of less than 100 students, but seven (15.2%) involved more than 1 000 students. Fifteen studies (32.6%)

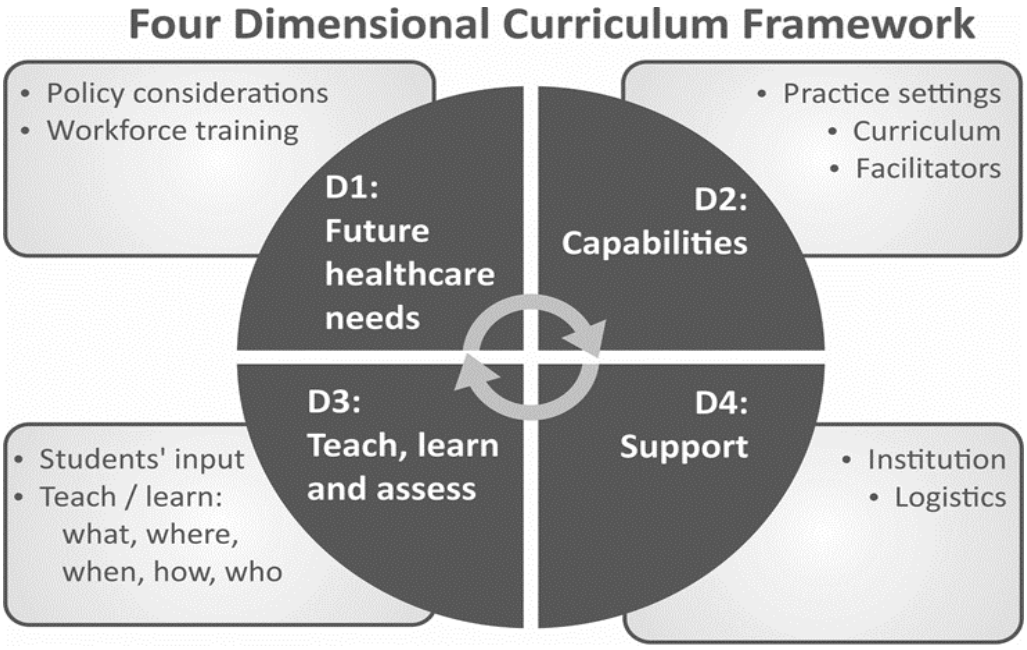

Figure 2: Factors extracted and aligned with the Four-Dimensional Curriculum Framework.
The four quadrants in the middle refer to the four dimensions of the Framework, e.g., D1 is dimension 1. The textboxes on the outside refer to the factors identified in the analysis of the articles and described in detail in the text.

reported on small group teaching, with student numbers varying between three to 14 students per group.

Country: Only five studies (6.9%) from Africa met the inclusion criteria. The majority of the included studies, 48 (66.6%), were from countries with IPECP competency frameworks – 15 (20.8%) each from USA and Australia, and nine (12.5%) each from Canada and UK.

Geographical considerations: The geographical suitability for offering joint IPECP activities refers to the availability of a variety of professions at the same university. Universities who do not offer courses to a variety of health care professions relied on nearby universities to join their IPECP initiatives[13]. Only three studies (4%) focussed on exposure of students to rural communities[14,15,16], one study described a mobile outreach exposure[17] and one study referred to exposure to a non-profit organisation[18]. The rest of the articles referred to studies in the local area where the university was located.

Focus of the programme: Six articles (8.3%) focused on the importance of a theoretical model to guide planning. The majority of articles, (45=62.5%) addressed interprofessional education in classroom settings. Eleven articles (15.3%) included only interprofessional collaboration and 10 (13.9%) focused on both education and collaboration.

Descriptive summary of factors according to the four dimensions framework

The data were analysed deductively using the 4DF. The 4DF guided the mapping of thematic data to each dimension. Findings are presented under each of the four dimensions. Figure 2 (above) provides a visual representation of the dimensions and associated factors.

Dimension 1: Identifying future health care needs – preparing and capacity building to ensure meeting the needs of the population

The planning of an IPECP curriculum should address the training needs of the health work force, i.e., the need for and required competencies of the included professions and consider national policy related to health care worker training and health care delivery.

Policy considerations: National policies address the political, social, and cultural factors that influence health care worker training and health care delivery. Positive results were achieved with a nationally driven and coordinated approach, associated with research i.e., coordinated nationally amongst universities and departments of health and embedded in government policies[19,20].

Health workforce training: An awareness of specific population health care needs, e.g., identifying care contexts and the variety of professionals needed, should inform training[20]. IPECP can conserve resources when professionals are aware of their unique roles and duplication of services are prevented[18].

Dimension 2: Defining and understanding interprofessional capabilities required for future success in practice

When planning to address the capabilities of the health care workers in the IPECP curriculum, environmental needs and staff requirements need consideration.

IPECP Curriculum: IPECP should be part of a profession's core curriculum and not seen as optional[21]. The curriculum needs to be presented as a tailored programme based on the specific needs of the included professions[22]. To tailor

the curriculum, planners need to identify shared prioritised themes for the specific professions involved, for example case studies where the role of each profession is overt[23]. Learning and teaching activities should be staggered and graded from theoretical appreciation to placement learning, to examining the complexity of modern teamwork in a range of clinical settings[6]. The advances in students' knowledge and experience should reflect the increasing complexity of IPECP activities[24].

Time frames for IPECP curriculum implementation were disputed[25]. For example, Wilbur and Kelly[26] stressed starting in first year, to allow for exposure before biases develop, in contrast to Imafuku et al.[27], who found it advantageous to start with final year students with an established sense of their own roles that they could apply during placements.

Setting/environment: Positive safe spaces, which could be shared, or neutral spaces, are experienced as supportive and conducive to learning and thus enable students to explore beliefs, learn to network professionally and to reflect on their own and others' personal and professional culture and values[28,29]. Clinical settings need to allow students opportunities to observe the real world and learn about the respective professions and their interprofessional roles[30,31].

Facilitator requirements: Planning IPECP is a complex and dynamic process[32] requiring an interprofessional team actively involved in planning and development[33]. IPECP facilitators/trained lecturers, need to be both familiar with the institutions' environment, and skilled in facilitation and student supervision[34], Facilitators should rather self-identify and be able to role model teamwork and be passionate about IPECP[34,35].

Dimension 3: Teaching, learning and assessment to address the development of core competencies

Teaching, learning and assessment: Specific teaching and learning components need to be tailored to student variables (who), context (where), timing (when), content (what) and teaching methods (how). When grouping students, planners need to appreciate, acknowledge and maximise diversity[24]. It is advisable to use intentional grouping of students (focused, heterogeneous in terms of gender, age, professions and cultures)[36], in groups with students of four to five professions[37]. Learning activities need to ensure students appreciate each other's roles and contributions while being able to acknowledge both the usefulness as well as the limitations of their own knowledge[38]. Jernigan et al.[39] therefore suggested authentic case studies, with significant clinical detail, necessitating involvement of the interprofessional team for problem solving and encouraging clinical reasoning.

Findings highlighted theoretical frameworks conducive to IPECP including Social Capital Theory[40] Socio Cultural Learning[41], Problem Based Learning[42] Complexity Theory[24] and Constructivist Theory[43]. Andragogical strategies to consider incorporated blended, face-to-face, flipped classroom, interactive and experiential learning/teaching[44]. Rosenfield et al.[45] caution about the use of large-scale activities as it could limit the amount of meaningful interaction. Assessments need to be aligned instructional methods with required outcomes[46].

Students input: Senior students, especially in their final year of study, can provide valuable input to curriculum development[47]. Students could comment on internal factors (insight and motivation to participate) as well as factors outside the programme (logistics and timing), that impact students' participation, due to their lived experience of the profession specific and IPECP curriculum[48]. Students identified authentic learning opportunities as experiencing problem solving in class, simulation, and clinical practice. Students appreciated opportunities to socialise both formally and informally with peers from other professions[49].

Dimension 4: Supporting institutional delivery

For long-term sustainability, IPECP needs to be part of the collective institutional vision[50], be embedded on symbolic and organisational culture levels[35] and part of a valued curriculum[48]. The characteristics of the institution and available resources requires special consideration.

Characteristics of the Institution: Multi-tiered support is required from committed staff members, both academics and clinicians, institution leadership/management and governmental stakeholders[50]. Pragmatic considerations include faculty timetabling, structural complexities of university partnerships, institutional systems and processes[51].

Physical, attitudinal, and human resources: IPECP is resource and time intensive, due to significant coordination required[52]. Centralised planning at a university, where planning is coordinated between different professions and involved schools could collectively address the logistics of implementation[33]. Focused effort to provide resources or infrastructure, necessitates inclusion of strong administrative support[24]. Attention should be on capacity to deliver the curriculum, e.g., sufficient human resources in terms of trained facilitators and sufficient administrative support. In addition, there should also be a concerted effort made to overcome perceived challenges such as time constraints in the timetable and lack of funds to present the programme[53, 54].

DISCUSSION

This review revealed a growing body of literature that describes factors influencing IPECP planning. Articles increased steadily from 2009 to 2020, reflecting the possibility that more universities incorporated IPECP on a larger scale into their curriculum; or more research conducted into the planning of IPECP curriculum. Analysis of the 72 articles found most originated in countries where government policies as well as competency frameworks for IPECP are in place. The benefit of having such support is acknowledged. In South Africa, as in many other African countries, the policies of IPECP are emergent. Even though an abundance of international literature is available, few South African specific guidelines were found. Nevertheless, the authors gained an in-depth understanding of intertwined factors to consider when planning and IPECP curriculum and realized the gaps for the South African context.

The descriptive summary of factors according to the four dimensions reflected the dynamic interaction between the

four dimensions. Specific professions, future healthcare needs, expected capabilities, curriculum content, teaching methods and available resources impacted one another.

It was evident that local, national, and international health and education policies influence IPECP application[20]. For a tailored curriculum, planners need to be cognisant of the purpose and content of the policies, while aligning the curriculum with the specific institution's mission and vision. In the South African context, the impact of possible changes related to the proposed National Health Insurance needs specific consideration when developing a national IPECP policy. ASSAF[55] proposed embedding IPECP in Health Professions Education in South Africa, as a multi-stakeholder, to make it more sustainable, by forming a national working group to develop and guide the implementation of a strategic plan for IPECP. The requirements of included professions' professional regulators, e.g., Health Professions Council of South Africa (HPCSA) consisting of different professional boards for different professions, in addition to the Nursing Council and Pharmacy Council, need to be considered when the programme is planned. If the specific expectations in terms of IPECP of these regulators could be same, it would make it easier for programme planners to plan the curriculum for a range of stakeholders. Organisations such as the South African Association of Health Educationalists (SAAHE) and the African Interprofessional Education Network (AfrIPEN), where IPECP experts work together to develop policies and resources for IPECP, contribute to growth in IPECP.

Worldwide there is an increasing demand for trained health care workers. From the scoped articles it became clear that IPECP in Africa is not as established as it is in developed economies[56], and one possible reason is the lack of national policies guiding IPECP. South Africa, with its particular geographical, socio-economic, cultural diversity, resource limitations and political history, has both universal as well as some unique challenges when it comes to the need for IPECP. The quadruple burden of disease in South Africa namely challenges in maternal, new-born and child health; HIV/AIDS and tuberculosis (TB); non-communicable diseases; and violence and injury combined with insufficient resources and the influence of poverty and workforce shortages makes the need for IPECP even more pronounced[34]. In tailoring a curriculum, the health work force needs of the specific included professions, individually and collectively, must be considered. For example, include the common conditions treated by the profession, to ensure that the IPECP activities are authentic and reflect practice needs[57]. IPECP could contribute to address health care's triple aim for improving patient experience quality and satisfaction with care, and through this addressing the health of the population and reduce the per capita cost of health care. Through collaborative practice patient care could be rendered more effectively by preventing unnecessary delays in care, unnecessary duplication of services and avoiding the need for re-admission because patients were discharged prematurely. IPECP forms an important part of the plans of the National Health Insurance which emphasizes the need for patients to be treated by a team[58].

To present a tailored curriculum, the IPECP core competencies, that guide the outcomes of the IPECP curriculum and therefore the selection of learning opportunities (activities, teaching methods and assessment methods), need to determine the duration and timing of the curriculum. Selected learning opportunities should suit the student characteristics for example the needs of the year group and combination of professions involved[3]. IPECP then facilitate the dual identity development of students as professional and as interprofessional team members[59,3]. In the South African context, it is important to pay attention to the type of case study that is most relevant to the specific professions involved and to address challenges related to diversity during IPECP group work. Examples could be stroke, head injuries, substance induced psychosis, post-traumatic stress disorder, spinal cord injuries.

Facilitators need to understand the institution and the health care system where the programme is presented. Knowledgeable, enthusiastic facilitators who make student's involvement enjoyable, contribute to students' positive attitude to future interprofessional collaboration[60].

Student involvement in curriculum planning increase IPECP programme acceptance and involvement[60,61]. Students who have experienced not only their own professions specific curriculum, but also the IPECP curriculum could share their experience of the learning opportunities' relevance[29].

For the sustainability of any IPECP programme, buy-in from the specific institutions' management is vital to overcome logistical barriers, such as financing and provide the necessary resources[35,48].

Throughout the review and the discussion, the relevance of sources was contemplated to ensure that it supports the South African context.

Limitations of the scoping review

Due to the abundance of available literature, important articles may have been inadvertently excluded, despite rigorous effort. Only five articles originating in Africa adhered to the inclusion criteria though there was abundance of international articles. This further highlighted the paucity of South African research in IPECP in terms of planning a curriculum relevant for the country's needs. The IPECP articles from Africa focussed more on IPECP implementation and is evident of IPECP in Africa as an emerging research area. Even though the scoping review did not provide sufficient information related to planning a specific South African IPECP curriculum, the discussion did however, indicate how differences in the context could be identified and considered in planning and aligning information to the specific university context.

CONCLUSION

The results from this scoping review have the potential to guide the planning of a tailored IPECP curriculum for an African university. Several intertwined factors were presented for consideration by curriculum planners and IPECP organisers and presenters. Findings could support university

management and policymakers as it provides summarised and synthesised evidence on how to establish a tailored IPECP curriculum. Key considerations include the specific professions involved, future healthcare needs of the country, expected capabilities and competencies of graduates, content and teaching methods and available resources influence one another.

Consideration of unique institutional contexts could guide planning a new or revised IPECP curriculum. A tailored curriculum will ensure that the healthcare needs of the local population is met and that students master interprofessional competencies using context-relevant teaching strategies.

AUTHOR CONTRIBUTIONS

Hanlie Pitout designed the study, collected, and analysed the data and drafted the initial manuscript and revised the manuscript. Fasloen Adams and Sanet du Toit contributed to the study design, supervised the data collection and analysis, and was actively engaged in the writing of the manuscript and Daleen Casteleijn assisted with refining the manuscript for publication. All authors were included in aspects of study design, data collection, analysis, interpretation of data; and/or drafting the paper; as well as final approval of the submitted version to be published and agreement to be accountable for included information.

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The authors have no declarations of competing interests to make, and no funding was received for this research.

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Addendum A: Table I Summary of included publications

	Author names and year	Name of article	Main concept (IPE, IPECP or CP)	Name of journal		Research approach and method QN= Quantitative QL= Qualitative MM = Mixed methods	Frequency Longitudinal (L); twice (T) once off (1x)	Participants and (year level) N= nursing; M=medicine, SW= social work, OT= occupational therapy, PT=Physiotherapy, PS=Psychology SP= speech therapy D= Dentistry HN/D: Human nutrition/Dietetics, Pha= Pharmacy, RD: radiography [group size specified]	Country and Context (university /clinical setting/ community area
1	Alinier et al. 2014	Immersive Clinical Simulation in Undergraduate Health Care Interprofessional Education	Simulation (IPE)	Clin Simul Nurs		QN: quasi randomised control group	L: 3 years	237 N, Pha, RD, PT, paramedic, SW [+/- 8 in group]	UK: British university
2	Anderson et al. 2016	Evaluating an interprofessional education curriculum: A theory-informed approach	Conceptual frameworks, theory (IPE)	Med. Teach.		MM: Meta-analysis	L: several years	Different stakeholders: 10 professions students, teachers, practitioners, patients, carers	UK: university, clinical
3	Avrech Bar et al. 2018	The role of personal resilience and personality traits of healthcare students on their attitudes towards interprofessional collaboration	Personality and attitude (IPECP)	Nurse Educ Today		QN: cross sectional, descriptive	1X	184 fourth year students N, OT, PT	Israel: Tel Aviv University
4	Beck et al., 2018	Attitudes toward interprofessional education improve over time	Attitudes (IPECP)	J Interprof Edu & Prac		QN: pre and post assessment	L: 3 years	175 students Allied Health, M, N, Pha, Public Health	USA: Universities of Nebraska and North Carolina
5	Berger et al., 2019	Encountering complexity in collaborative learning activities: an exploratory case study with undergraduate health professionals	Learning activities (IPE)	J Interprof Care		QL: case studies	1X	67 students: Lab Tech, M, N, PT, OT, SLPA, RD, Midwifery [4-5 students/team]	Germany: University Hospital Heidelberg
6	Berger et al. 2017	Anchoring interprofessional education in undergraduate curricula: The Heidelberg story	Change management (IPE)	J Interprof Care		QL: Case study	1X – pilot study	Faculty: IPG and Medical	Germany: Heidelberg University
7	Botma, Y. 2019.	Consensus on interprofessional facilitator capabilities.	Facilitator capabilities (IPECP)	J Interprof Care		QN: Delphi study	1X	IPECP experts	South Africa: University of Free State
8	Brault et al. 2015	Implementation of IP learning activities in a professional practicum: technology	Technology (IPC)	J Interprof Care		QL: focus groups	1X- pilot study	31 students, 10 professions; cl supervisors, man. (4000 students participate	Canada, Quebec Clinical
9	Cerbin-Koczorowska, , 2019	As the twig is bent, so is the tree inclined: a survey of student attitudes toward interprofessional collaboration supported with the curricula analysis	Curriculum (IPECP)	J Interprof Care		QN: cross-sectional survey-based	L: 3 years	502 final year students: Pha, M	Poland: Poznan University of Medical Sciences
10	Chicorelli et al 2016	Canadian student leaders' perspective on IPE: A consensus statement	Student's input (IPE)	J Interprof Care		QL: focus group	1X	12 student leaders N, SW, 8 Universities	Canadian Universities
11	Claramita et al, 2019	Interprofessional communication in a socio-hierarchical culture: development of the TRI-O guide	Communication skills (IPE)	J Multidiscip Healthc		QN: Pre-post, quasi experimental	1X pilot	53 first- and 107 fourth-year undergraduate students M, N, HN/D	Indonesia: Universitas Gadjah Mada, Yogyakarta,
12	Conway 2009	Implementing interprofessional learning in clinical education: findings from a utility-led evaluation	Clinical training (IPC)	Contemp Nurse		QL: interviews	1X	students, academics, clinicians	Newcastle, Australia: University and hospital ward
13	Cradock et al. 2013	A top-down approach impedes the use of theory?	Theory (IPE)	J Interprof Care		QL: Interviews: Grounded theory	1X	IPE curriculum developers	UK: 8 Universities
14	Croker et al. 2016	Educators working together for IPE : From "fragmented beginnings" to "being intentionally IP"	Educators attitude (IPE)	J Interprof Care		QL: interviews and focus groups: collaborative dialogical inquiry	1X	M, N, radio, SW, OT, PT, SP, HN: IPE educators	Australia: Newcastle University
15	Curran et al. 2010	Longitudinal study of effect of IPE curriculum on student satisfaction and attitudes toward IP team	Logistics (IPECP)	J Interprof Care		QN: 3 questionnaires; time series	L: 3 years	M, SW, N, Pha [group but size not specified]	Canada: Newfoundland. University and Nursing School
16	Cusack + O'Donoghue, 2012	The introduction of an interprofessional education module: students' perceptions	Theory (IPE)	Prim. Care		QN: questionnaire with qualitative and quantitative data	1X	92 PT, N, M, RD; elective [8-10 students]	Ireland: Dublin University
17	De Vries-Erich et al., 2017	Identifying facilitators and barriers for implementation of IPE: medical educators in the Netherlands	SWOT: Barriers and enablers (IPE)	J Interprof Care		QL: Interviews	1X	14 health educators: professions not specified	Netherlands: Amsterdam different universities IPE-SIG
18	Engel et al.. 2017	A Power Experience: A Phenomenological Study of Interprofessional Education	Social interaction (IPC)	J Prof Nurs		QL: Interviews Hermeneutic phenomenology	1X	17 students M (1st + 2nd , N: 3rd and 4th year	Canada: Ontario: two Universities
19	Fitzsimmons et al. 2014	A learner developed longitudinal interprofessional education curriculum	Student input (IPE)	J Interprof Care		QN: pre-post-test experimental	1X	480 1st years: M, N, D, Pha	USA: University: California
20	Fook et al. , 2013	Taking the long view: exploring dev of IPE	Logistics especially leadership (IPE)	J Interprof Care		QL: exploratory case study	L: 15 years	19 key informants biochem, clinical sciences, N, OT, PT, podiatry, RD, SW	UK: London: service providers
21	Forte + Fowler, 2009	Participation in interprofessional education: An evaluation of student and staff experiences	Group dynamics, theory (IPE)	J Interprof Care		QL: focus groups staff and students	L: 5 years	Undergraduate students and staff: OT, PT, RD	UK: London University with full time and part time students

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	Author names and year	Name of article	Main concept (IPE, IPECP or CP)	Name of journal		Research approach and method QN= Quantitative QL= Qualitative MM = Mixed methods	Frequency Longitudinal (L); twice (T) once off (1x)	Participants and (year level) N= nursing; M=medicine, SW= social work, OT= occupational therapy, PT=Physiotherapy, PS=Psychology SP= speech therapy D= Dentistry HN/D: Human nutrition/Dietetics, Pha= Pharmacy, RD: radiography [group size specified]	Country and Context (university /clinical setting/ community area
22	Fougner + Horntvedt, 2011	Students' reflections on shadowing interprofessional teamwork: a Norwegian case study	Clinical learning (IPC)	J Interprof Care		QL: focus groups	1X	2nd year students: OT, PT, N, 30 reps [3 in group]	Norway; Oslo: hospital and homes
23	Gilligan et al., 2014	Recommendations from recent graduates on improving IPE in university programs	Student input (IPECP)	BMC Med. Educ		QL: focus groups	1X	68 recent graduates, 12 focus groups	Australia: Perth hospital
24	Gordon, et al. 2010	Developing an e pedagogy for IPL: lecturers thinking on curriculum design	Use of technology (IPE)	J Interprof Care		QL: interviews	1X	21 lecturers: SW, PT, OT, N, Sport and exercise, RD, Oncology	UK: Sheffield university
25	Hallam et al. 2016	Do commencing students differ in IP learning and practice attitudes	Team and group (IPE)	BMC Med. Educ		QN: GPSES, ATCHTS, IEPS, International big 5 mini markers test	1X	210 N, paramedic 1st year students	Australia, Melbourne, University
26	Hayashi et al, 2012	Changes in attitudes toward interprofessional health care teams	Influence of year level (IPE)	J Interprof Care		QN: On line survey, ATHCTS, RIPLS	1X	Sudents: 1st and 3rd years of N (80), OT(20), PT(20), Lab (40)	Japan: Gunma University
27	Hean et al. , 2012	Theoretical insights into IPE AMEE Guide no 62	Theory (IPE)	Med. Teach.		QL: case study	1X	AMEE Guide	UK: University Bournemouth, Southampton, Birmingham
28	Homeyer et al., 2018	Effect of IPE on Medicine and Nursing	Curriculum implications (IPECP)	BMC Nursing		QN: Delphi	1X	25 experts	Germany: University, Greifswald
29	Imafuku, et al, 2018	What did first-year students experience during their IPE? A qualitative analysis of e-portfolios	Learning (IPE)	J Interprof Care		QL: exploratory case study: Phenomenography: analysis of reflections	1X	26 1st year students: M, N, Phar, N, PT, OT [8-9 students in group]	Japan: University and clinical areas: Showa
30	Jernigan et al, 2018	Teaching for Practice: The Impact of a Large-Scale Interprofessional Foundational Program	TeamSTEPPS (IPE)	J Allied Health		MM: Questionniares	1X	715 students of 15 professions: OT, PT, SLPA, HN/D, M, N, Pha, SW, 1-3 rd years	USA: University of Kansas
31	Jorm et al. , 2016	Using complexity theory to develop	Learning and theory (IPE)	BMC Med. Educ		MM: questionnaire and analysis of video and case study	1X	1220 students different year groups: Rad, M, N, OT, Pha, PT, ST [5 – 6 students per group]	Australia: University: Sydney
32	Junod Perron, et al. 2014	Needs assessment for training in interprofessional skills in Swiss primary care: a Delphi study	Themes and skills (IPC)	J Interprof Care		QN: Delphi study: Electronic survey	1X	12 categories of health professionals: practitioners, trainers, trainees	Switzerland: University and Hospitals: Geneva
33	Karuguti et al. , 2017	Analysing the cognitive rigor	Assessment (IPE)	J Interprof Care		QL: Quantitative content analysis: DOK framework	1X	Curriculum for PT, OT, Psych, N, Natural Medicine, Sport Sciences	South Africa: University: Western Cape
34	Kesselheim et al. 2019	Discharge Day: A Case-Based Interprofessional Exercise About Team Collaboration in Pediatrics	Discharge planning (IPECP)	MedEdPortal		MM: survey	3X	Final year: 192, M, SW, Pha, HN/D [9 per group]	USA, Harvard Medical School
35	Kickett et al. 2014	A Model for Large-Scale, Interprofessional, Compulsory Cross-Cultural Education with an Indigenous Focus	Teaching (IPE)	J. Allied Health,		QN: survey with qualitative and quantitative data	2X	1570 students, 1st years, 50 groups, 19 professions N, Public Health, PT, Pha, S P, N, Psych, oral health others	Australia, Perth University Curtin
36	Kururi et al. 2014	Professional identity acquisition process model in interprofessional education using structural equation modelling: 10-year initiative survey	Professional identity (IPE)	J Interprof Care		MM: model dev and testing	L: 9 years	3rd years: nursing, lab science, PT + OT	Japan, Gunma University
37	Laraimore et al., 2017	Impact of team composition	Team composition (IPE)	J Interprof Care		QN: survey 2 group quasi experimental: RIPLS and IEPS	L: 6 years	991 Students 5 – 10 professions: D, N, OT, PT, SLP, Pha, PS, Exercise Science	USA: Universities in Arkansas
38	Lehrer et al., 2015	Peer-led problem-based learning in interprofessional education of health professions students	Students input (IPE)	Med. Educ online		QL: Case control study design: IEPS	1X	M + Pha: 97 students [10 – 14 students in group]	USA, University and hospital, Arizona
39	Levett-Jones, 2018	Case Studies of Interprofessional Education Initiatives From Five Countries	Case studies of application (IPC)	J Nurs Scholarsh		MM	1X	Comparison of settings with different types and numbers of students in each	Australia: University of Technology Sydney and 6 others
40	Lockeman et al., 2017	Outcomes of Introducing Early Learners to IPE competencies in Classroom Setting	Socialisation (IPE)	Teach Learn Med.		MM: case series, students self-assessment with SPICE-R2 pre and post, Student peer assessment, Faculty Assessment	1X	1st years: 555: D, dent hygiene, M, N, OT, PT, Pha [5-6 students in group]	USA, University Virginia
41	Mathews et al, 2011	Building capacity in Australian	National coordinated approach (IPECP)	Aust Health Rev.		QL: 27 interviews and 2 focus groups	1X	key stakeholders in Higher Edu and health	Australia, University in Sydney
42	McKenna et al., 2014	Promoting interprofessional understandings through online learning :A qualitative examination	Online learning (IPE)	NHS		QL: 3 focus groups withy 13- 15 students each	1X	Students: different year groups: OT, PT, N, HN, emergency care	Australia, University in Melbourne
43	McMurty, 2010	Complexity, collective learning and the education	Learning: collective (IPC)	J Interprof Care		Action research	3 spiral cycles	M, D, N, Pha and Rehab [8 – 10 students in group]	Canada, University: health team course: Ottawa

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44	Mellor et al., 2013	Just working in a team was a great experience… - St perspectives on the learning experience of an IPE program	Students experiences (IPE)	J Interprof Care		QL: interviews: Interpretative phenomenological analysis	1X	M, Pha, N, OT, PT [6 – 8 students in group]	Australia, University: Queensland
45	Michalec et al. , 2017	Health Professions Students' Perceptions of Their IPE program	Students perceptions (IPECP)	J Allied Health		Case study: interviews	2X	20 students from 6 professions (Couple and family therapy, M, N, OT, Pha, PT) 1st and 2nd years	USA: University Delaware
46	Milot et al., 2015	Building an interfaculty IPE curriculum: Université Laval	Logistics (IPE)	Edu Health		Case study	L: 10 years	10 health and social sciences programs, 400 students [8 – 10 students in group]	Canada, University Quebec
47	Muller et al., 2019	The value of interprofessional education in identifying unaddressed primary health-care challenges in a community: a case study from South Africa	Primary health care (IPECP)	J Interprof Care		QN: case study	L; 4 years	Students: M, OT, PT, SLPA, HN/D, SW, N, RD, Podiatry	South Africa, Stellenbosch University: community, rural area
48	O'Hara, et al., 2018	Development of an e-learning programme to improve knowledge of interprofessional education. British Journal of	E-learning in IPECP	Nursing, 27 (21), 1242-1245.		QN: case study	1X.	Students: M, OT, PT, SLPA, HN/D, SW, N, RD, Podiatry	Ireland: Queen's University Belfast
49	Olson + Brosnan, 2017	Examining IPE through the lens of Interdisciplinarity: Power, Knowledge and new ontological subjects	Conceptualisation; theoretical framework (IPE)	Minerva		QL: 19 Interviews	L: first 2 years	9 professions, 400 – 900 students, 1st and 2nd year: OT, PT, podiatry, therapeutic recreation, health service management	Australia, University: New Castle
50	Olson et al., 2016	Reimagining health professional socialisation	Professional ID (IPE)	Health Sociology review		QL: interviews	L: first year	19 students: 1st years, 6 professions: OT, PT, podiatry, Therapeutic recreation, Traditional Chinese medicine,	Australia, University, Queensland
51	O'Neil-Pirozzi et al., 2019	Impact of Early Implementation of Experiential Education on the Development of Interprofessional Education Knowledge and Skill Competencies	Early exposure (IPE)	J Allied Health		QN: pre post intervention	1X	127 students: 1st years, N, Pha, PT, SLPA	USA: North Eastern University
52	Pardue, 2013	Not left to chance: curriculum framework	Curriculum content dual ID (IPECP)	J Interprof Care		QL: appreciative enquiry	1X	N, OT, Applied exercise science, athletic training, dental hygiene,	USA, Portland University
53	Paslawski, et al. 2014	Action, reflection and evolution: a pilot implementation of IPE across 3 disciplines	Less successful (IPECP)	J Res Interprof Pract Educ		Action research	1X	OT, ST, PT curriculum developers	Canada, University, Alberta
54	Prast et al., 2016	Practical Strategies for Integrating IPE	Faculty (IPECP)	Occup. Ther. Health Care		QL: focus groups	1X	OT, N, SW, Med Lab [8 -12 students in group]	USA, University, Saginaw Valley
55	Reitsma et al. 2019	Health students' experiences of the process of interprofessional education: a pilot project.	IPE process	J Interprof Care		MM: sequential	1X	N, Pha, HN/D, Ps, SW, HM	South Africa: North West University.
56	Rosenfield et al., 2011	Perceptions versus reality	Student expectations (IPE)	Med. Educ		QL: exploratory case study, focus groups	2X	M, Pha, D, OT, SW	Canada: University; Ontario,
57	Rotz et al., 2015	Exploring first-year pharmacy and medical students' experiences during longitudinal IPE	IPE intro early or late (IPE)	Curr Pharm Teach Learn		QL: focus group, 6 students per group	1X	18 Pha and M, 1st year students [3 students in a team]	USA, University, Philadelphia
58	Stanley & Stanley, 2019	The HEIPS framework: Scaffolding interprofessional education starts with health professional educators	Educators framework (IPE)	Nurse Education Practice		QL: Interpretive phenomenological, individual interviews	1X	26 educators	Perth, Western Australia, 5 Universities
59	Steketee et al., 2014	Interprofessional health education in Australia: 3 project for curriculum	Curriculum (IPE)	Appl Nurs Res		MM: surveys and interviews	1X	9 Univ, NGOs and industry bodies	Australia: Universities:
60	Skolka et al. , 2020	Attitude adjustments after global health inter-professional student team experiences	Mobile outreach (IPC)	Md Med J		MM: questionnaire and survey	3X	45 Students, first to 4th year: M, Physician assistants, N	USA: Penn State University Community involvement
61	Soubra et al., 2018	Effect of Interprofessional Education on Role Clarification and Patient Care Planning by Health Professions Students	New course (IPE)	Health Prof Edu		QN Descriptive survey	1X	266 senior students D, Med Lab, N, HN/D, PT, Pha	Lebanon: Beirut Arab University
62	Stanley & Stanley, 2019	The HEIPS framework: Scaffolding interprofessional education starts with health professional educators	Framework for facilitators (IPE)	Nurse Edu in Prac		QL: Interpretive phenomelogical framework	1X	26 Educators	Australia: Charles Sturt University
63	Tartavoulle et al., 2016	Using the IDEA framework in an IP didactic elective course; roles and responsibilities	Dual ID : social (IPE)	J Interprof Care		QN: RIPLS, IPEC	1X	Allied H, D, M, N, Pha and Public Health [10 students in group]	USA, University, New Orleans
64	Titus & Roman (2019).	Predictors if student agency: the relationship between student agency, learning support and learning experience in an interprofessional health science faculty.	Students support (IPE)	J Interprof Care		QN: questionnaire	1X	PT, OT, N, SW, Ps, D/HN, Nat Med	South Africa, University of Western Cape
65	Van Lierop et al. , 2019	Jointly discussing care plans for real-life patients: The potential of a student-led interprofessional team meeting in undergraduate health professions education	Real life cases (IPC)	Perspect Med Educ		QL: focus groups	2X	360 X 2 M, N, Allied Health [10 students of which 5 M]	The Netherlands: Maastricht University, hospital
66	Venville & Andrews, 2020	Building great health care teams: enhancing interprofessional work readiness skills, knowledge and values for undergraduate health care students	Patient voice (IPECP)	J Interprof Care		QN: Pre post study	1 X	28 Final year students: SW, OT, PT, SLPA, N, Psy, HN/D [8 students per group]	Australia, Victoria University
67	Walker et al., 2019	Students' experiences and perceptions of interprofessional education during rural placement: A mixed methods study	Rural placement learning opportunities (IPC)	Nurse Educ Today		MM: RIPL and interviews	1 X	60 students of Allied Health, M, N, Midwifery	Australia: Monash University Rural area

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	Author names and year	Name of article	Main concept (IPE, IPECP or CP)	Name of journal		Research approach and method QN= Quantitative QL= Qualitative MM = Mixed methods	Frequency Longitudinal (L); twice (T) once off (1x)	Participants and (year level) N= nursing; M=medicine, SW= social work, OT= occupational therapy, PT=Physiotherapy, PS=Psychology SP= speech therapy D= Dentistry HN/D: Human nutrition/Dietetics, Pha= Pharmacy, RD: radiography [group size specified]	Country and Context (university /clinical setting/ community area
68	Waller et al., 2019	Interprofessional simulation in a student community clinic: insights from an educational framework and contact theory	Framework development (IPE)	BMC Adv Simul (Lond)		QL: Interviews	1X	40 students, 12 SPs and 5 facilitators	Australia: Monash University, Clayton
69	Ward et al., 2016	Development, implementation and evaluation of longitudinal IPE	Longitudinal (IPE)	J Res Interprof Pract Educ		QN: Pre post test	1X	N, M. Pha, SW, Diet [6–8 per team]	USA, Washington university
70	Waterston, 2011	Interaction in online interprofessional education case discussions	Online (IPECP)	J Interprof Care		MM: survey, online discussions, care management plans	1X	490 students, 77 facilitators, D, M, N, OT, Pha, PT [8–9 students]	Canada, University, Toronto
71	West, et al. 2016	Implementation of IPE in 16 US medical schools: Common practices, barriers and facilitators	Barriers and enablers (IPE)	J Interprof Educ Pract		MM: observational cross sectional: survey	1X	16 Medical Schools	USA: Universities
72	Wilbur + Kelly, 2015	Interprofessional impressions among nursing and pharmacy students	Students attitudes, beliefs, values (IPE)	BMC Med. Educ		QL: focus groups and interview	1X	200 students, N and Pha, year not indicated	Middle East: Qatar: University

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