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Taxonomy of teaching methods and their use in health professions education: a scoping review protocol

Sharon Mitchell [ORCID],[1] Carolin Sehlbach [ORCID],[2] Gregor H L Franssen [ORCID],[3] Janusz Janczukowicz [ORCID],[4] Sissel Guttormsen[1,5]

¹Institute for Medical Education, Graduate School of Health Sciences, University of Bern, Bern, Switzerland
²Department of Educational Research and Development, School of Health Professions Education, Maastricht University, Maastricht, Netherlands
³Maastricht University Library, Maastricht University, Maastricht, Netherlands
⁴Centre for Medical Education, Medical University of Lodz, Lodz, Poland
⁵Institute for Medical Education, Medical Faculty, University of Bern, Bern, Switzerland

Correspondence to
Sharon Mitchell;
sharon.mitchell@unibe.ch

ABSTRACT

Introduction Applying the lens of social constructivist theory, teaching methods facilitate the process of learning and may be used differently across settings to align learning goals. Teaching methods are used across disciplines, occupations and learning settings, yet terminology, descriptions and application for use vary widely. This scoping review will identify eligible literature of reported teaching methods with documented descriptions across disciplines with a focus of how teaching methods are applied to health professions education. A literary description of a teaching method was used as a basis from which to select eligible articles based on two criteria, a specified method and delivery of that teaching by a teacher figure.

Methods and analysis Using the extension of the Joanna Briggs Institute methodology aligned to Arksey and O'Malley's six-stage framework and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews guidelines, this scoping review will systematically search ERIC, Embase, Web of Science and PubMed databases. The search strategy was supported by an information specialist. Eligible studies will be identified in a two-stage screening process with four researchers. To complement eligible peer-reviewed literature, we will also search out relevant grey literature including University Websites, Conference Programmes and handsearched reference lists. Data extraction will be performed using a developed data extraction tool. A narrative summary will accompany charted results and describe the results aligned to the study objectives.

Ethics and dissemination As no intervention or patient recruitment is required for this research, ethics board approval is not required. Results will be disseminated via publication in a peer-reviewed journal, conference presentations and where feasible reaching out to those organisations and universities with published glossaries of terms for teaching.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Scoping review is an appropriate design methodology to seek out descriptions of teaching methods and how they are used in practice.
⇒ Our literature search includes four databases, ERIC, Embase, PubMed and Web of Science as well as unpublished, grey literature.
⇒ The search strategy is developed with the support of a scientific research specialist with experience in literature searching.
⇒ An anticipated challenge will be to capture the variability of presented methods in a logical sequence and identify common characteristics across methods.
⇒ Our search strategy evolved to include eligible articles by specific teaching method terms, which may elicit relevant articles of searched terms, but finding less familiar teaching methods is not a guarantee.

INTRODUCTION

Different teaching methods are used in education to support learners in the process of constructing knowledge, skills and attitudes (competencies) from entry into medical education through to the transition out of their medical careers. Yet, there is little evidence of our profession's clarity of understanding of teaching methods terms and definitions. To investigate how teaching methods are applied within health professions education, we will first look beyond the professional boundaries of health and investigate how teaching methods are described and used in academia across disciplines.

As a foundation to launch this research and as part of a second study, we searched for a comprehensive published list of teaching methods or teaching strategies used in health professions education, without success. University libraries, congress programmes and published education handbooks offered some guidance,[1–8] with no uniformity of how teaching methods are described and used within health professions education. This initial review of the literature to scope out descriptions of teaching methods using a systematic methodological approach became the springboard from which to build our research plan. A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews and JBI Evidence

Synthesis was conducted and no current or in-progress systematic reviews on the topic were identified.

Teaching methods can be described as methods that deliver content or facilitates the learning process to acquire new knowledge or skills, with the intention of changed behaviour in practice,[9] or as actionable educational practices to facilitate learning and development.[10] Teaching strategies are referred to as multiple teaching methods used to deliver a broader set of learning outcomes.[11] For teaching methods to be effective, so they may lead to meaningful practice change, teaching should adopt the principles of adult learning theory and facilitate learning activities such as feedback, reflection or team-based activities, for example (social cognitive learning theory).[12] Preparing and agreeing on a definition of a teaching method is essential to ground our research objectives to achieve expected outcomes. Yet there is no single agreed definition of a teaching method, and teaching methods do not always lead to the intended changed behaviour.

Research investigating the effectiveness of teaching methods is not new. Davis *et al*[13] opened the door to small-scale reviews to compare different teaching methods. Studies that have systematically searched the literature for effectiveness of a list of teaching methods have been published steadily in recent literature[14 15] particularly linked to simulation[16–19] or peer-based teaching,[20] as well as methods effective to promote positive outcomes in specific settings.[21–25] The work of John Hattie 2012 that investigated and published effective teaching-learning strategies brought evidence-based teaching to new heights,[26] and brought together an established list as a means to compare and contrast effective methods. More recently, the comparison of effective teaching and learning factors from Huang *et al* within clinical education has made this research more contextually specific to health professions education,[11] detailing the effectiveness of an elaborated list of different methods. These studies provide essential foundations for the justification for use of teaching methods and strategies. Yet, each of these studies present a different list of methods or strategies without definitions for shared understanding. For example, one study refers to small-group teaching as a teaching-learning factor, while another uses small-group teaching as a category, for example, case-based discussions and workshops may be categorised as small-group teaching. It is difficult to deduce a list of methods, presented with meaningful descriptions or categories, and as a separate research focus from those investigating the effectiveness. To our knowledge, within health professions education, a taxonomy of methods, built from a systematic methodological approach, and presented in an organised structure is missing.[11 27]

The results of this scoping review may contribute to the advancement of research that investigates effectiveness of teaching methods and strategies, to provide a source and organisation structure, offering a common understanding of terms. The results of the scoping review presenting a methodologically sound taxonomy will be useful for teachers across disciplines to offer overall didactic guidance to design teaching. Currently, the foundations from which teaching methods are referenced are blurry, with different descriptions attached to a method, risking misunderstanding and suboptimal research. Also, there is little known about the use of different teaching methods in health professions education and for which purpose. Building on previously published research calling for definitional clarity of terms and concepts,[28 29] it is intended that the results of this review will offer clarity on definitional differences specific to teaching methods with a focus on application to health professions education.

The potential value of this systematic scoping review is to enlighten educators on use of methods and strategies to facilitate knowledge and skills acquisition across contexts and settings, using the lens of social constructivism.[12] To our knowledge, this investigation will be the first to describe an overall taxonomy of teaching methods using a methodological search approach, presenting a consolidated description of each method, and reported use in different disciplines. To build a taxonomy of teaching methods, with necessary descriptions, it is essential to look at an acceptable definition of teaching methods as baseline reference. For this Scoping Review the research team agreed the following adapted definition: a teaching method is characterised by a set of principles, procedures or strategies to be implemented by educators to achieve a desired learning outcome in students/learners.[30]

Systematic scoping reviews are relatively new to secondary research and guidance provided by a flurry of published articles offer a structured approach to conduct and report on scoping reviews.[31–33] This protocol reports on our ongoing research presenting stages completed and planned next steps.

METHODS AND ANALYSIS

This scoping review follows the review frameworks for methodological guidance for conducting a Joanna Briggs Institute (JBI) scoping review,[34 35] aligned to Arksey & O'Malley's framework[32] and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR)[36 37] (online supplemental file 1). The optional sixth step is aligned to the Arksey & O'Malley framework proposing a consultation with key stakeholders, which the research team has agreed as an appropriate step to come to consensus on definitions of terms found within the scoping review research.[32 38] Given the breadth and scope of research needed to identify a comprehensive list of teaching methods, it is anticipated that we will receive high numbers of search results, and so a scoping review is deemed appropriate.[33] This protocol has been registered on the Open Science Framework on 14 June 2023. Given the breadth and scope of this research, there will be no systematic quality assessment of data found. This is also due to the intended variability of

data from grey literature to published peer-review articles.[37] Additionally, the very essence of scoping reviews is to summarise and provide a narrative description of coverage of findings.[33]

Identifying the research questions

The specific objectives of this scoping review are to (1) conduct a systematic search for teaching method descriptions across disciplines, (2) to analyse the descriptions to group similar descriptions of terms (3) and group teaching methods by characteristics within an overall classification structure, within a presented taxonomy. To reach these objectives, the following research questions have been identified.

1. What teaching methods are used to facilitate knowledge and skills acquisition?
2. How are teaching methods described in the literature?
3. Are characteristics of teaching methods well aligned across academic disciplines?

Search strategy

With the support of a university library information specialist, comprehensive search strategies were developed in biweekly workshops between January and July 2022 with the two lead researchers. All researchers met together in June 2022 to agree on the search string, and the approach to gathering relevant studies, descriptions for teaching methods and an agreed study design. An initial limited search of ERIC and PubMed was undertaken, which uses a combination of search terms (Thesaurus, MeSH) and free text terms. The text words within the titles and abstracts were used to develop a full search strategy with truncation, adjacency and phrase-searching techniques as outlined in PRISMA-ScR.[39]

From a pilot search of PubMed and ERIC, the research team deduced a search matrix to organise terms in four distinct blocks including (1) overall search terms, (2) teaching method terms, (3) specific teaching method terms and (4) education terms. An initial list of methods was devised through hand searching and review of the literature.[40 41] The search for MeSH terms (PubMed) and browsing thesaurus (ERIC) identified additional terms through an iterative process guided by GHLF, the scientific information specialist who supported development of the search string aligned to the research objectives.

Applying the accepted definition of teaching methods,[30] the research team compiled an initial list of methods included as a search block within the search strategy. All identified keywords and index terms will be adapted for each included information source. The search strategy will be supplemented by manually screening bibliographies and references or relevant studies. The search will include both published peer-reviewed articles and grey literature. Following the assessment of relevance of online databases, ERIC (EBSCO), Embase (Ovid), Web of Science and PubMed were selected. Online databases will be used to identify papers from 2012 to 2022 to limit searched papers and focus on relevant teaching methods

to current practice particularly capturing digital and social media teaching practices.

The search for MeSH terms (PubMed) and Thesaurus terms (ERIC) identified additional teaching methods through an iterative process guided by the research librarian. In June 2022, three combination options were searched in ERIC to include broad and narrow search terms. Initial search results elicited just under 832 000 papers, and consequently required the research team to find solutions to reduce the number of research papers. The search string was refined to a final list of terms (online supplemental file 2) and 15 293 results, by altering the search string to reduce number of search years and apply OR rather than AND appropriately. All search strings were guided by the scientific information specialist in an iterative process of reviewing, adding and testing combinations of search terms, until the identified relevant articles were found. A total of 949 duplicate articles were removed following the Wichor Bramer method.[42] A further 641 articles were removed on EndNote with the following search terms (Elementar*, English language*, Geograph*, History teach*, middle school, pre-school, primary school, secondary education, math*). The final number of articles to be screened is 13 703. All identified records have been collated and uploaded to EndNote V.X9.

Study selection

The population-concept-context framework proposed by recommendations of JBI Scoping Reviews, for inclusion and exclusion criteria was applied to the eligibility criteria (table 1). This review will consider studies and grey literature that describe or define a teaching method, a teaching strategy, instruction or approach across disciplines, and their use to support learners to acquire knowledge and skills.

Eligibility criteria

All types of research designs, qualitative and quantitative, will be included within the search without limits. Published qualitative and quantitative studies presented in academic journals will be considered for inclusion. Conference abstracts, opinion papers, white papers, studies in progress and other data will also be included for consideration. Grey literature including book chapters, glossaries of terms, university websites and medical scientific and education congress programmes, as examples, will be searched as a secondary objective. These targeted searches for grey literature will be performed using (1) Google, (2) the websites of universities, education and scientific congresses, identified through listed conferences, universities and (3) books, using the first four pages of results.

The research team will assess study eligibility independently of each other for all relevant articles found. All found articles were uploaded to EPPI Reviewer[43] to record decisions of eligibility across the research team. The eligibility criteria were discussed, tested and modified

Table 1 Inclusion and exclusion criteria

	Inclusion criteria	Exclusion criteria
Population	Target group are teachers and learners from undergraduate, postgraduate and continuing education/continuing professional development	Target group teachers and learners in primary and secondary education Any sports-related training aligned to exercise training and physical activity
Concept	Any listed teaching methods including published and grey literature	None
	Published and grey literature on teaching methods, based on the agreed definition[30] A teaching method is characterised by (1) a set of principles, procedures or strategies and (2) to be implemented by teachers to achieve desired learning in students. Therefore, aligned to this definition, the abstract must mention at least one of the following aligned to this description. 1. A teaching method (eg, case study, workshop, small group, lecture) 2. Delivered by a faculty member including teacher or trainer or facilitator or faculty or coach or mentor or educator	Outside the scope of the definition
	Article describing the setting of implementation (any combination of online, onsite or workplace-based teaching, where the instruction takes place). No restriction on learning environment, online (websites, phone apps, learning platforms, etc), onsite (classrooms, laboratories, simulations centres, workplace settings)	Articles do not explicitly list the settings of implementation
	Articles that have a description or definition of a method	Articles that do not offer a description of the method or describe an approach to teaching or learning, for example, problem-based learning, competency-based learning)
Context	Articles published 2011–2023	Articles published before 2011
	Published in English	Published in other languages
	Grey literature and original research	None
	All learning environments	None

in an iterative process to consider eligible articles aligned to inclusion and exclusion criteria between February and August 2022. Consensus among the research team led to the final eligibility criteria. A two-step approach will be followed, first to select eligible articles from a title and abstract screening conducted by three researchers. A fourth researcher will join regular biweekly meetings as an adjudicator for any uncertainty or dispute. An agreed number of titles and abstracts will be screened by all researchers to ensure consistency is reached at the beginning of the screening process, additional iterations reviews for consistency may be added if consistency is considered low. The team will calculate inter-rater reliability after each step of the selection. Full-text articles will be selected for inclusion if selected studies include a description or definition of a teaching method and plotted this information to the PRISMA-ScR flow chart.[36]

Assessment of methodological quality

Eligible studies will be critically appraised by three independent reviewers for methodological quality using the standard JBI crucial appraisal checklist for qualitative research.[44] To minimise the likelihood of excluding relevant papers, a systematic approach was applied to review a sample of excluded articles during the title and abstract

screening process. Following this, a random selection process was used to choose two papers from this subset of excluded papers. During weekly meetings with the research team, two selected papers (out of each group of 50 excluded articles), will be subjected to a comprehensive screening process involving an in-depth analysis of their complete textual content. The results of this appraisal will be reported in the final scoping review paper. It is important to emphasise that authors of the included papers frequently use the terms 'method,' 'approach' and 'strategy' interchangeably, highlighting the need for reviewers to exercise caution during the screening process.

Data charting

The research team will use a standardised data extraction sheet, guided by online supplemental file 1, 11.1 from the JBI Scoping Review Manual, to extract data from a defined list[34] (online supplemental file 3). The data sheet will be tested independently by reviewers on a random sample and revised throughout the screening process. Each researcher will independently read each article and extract relevant data. Findings, and their illustrations, will be extracted and assigned a level of credibility. Disagreements will be resolved by consensus, and where

appropriate additional members of the team will be invited to discussions. Any disagreement will be resolved through consensus in weekly meetings. In case of missing information (such as unreported data) impacting the decision of whether a study is eligible or not or impairing data extraction, the researchers will make a collective decision to include or exclude the study based on available data. Due to the large number of studies found, it was decided not to attempt contacting authors, unless the research cannot find at least 2 definitions of a presented teaching method.

Data synthesis

Simple quantitative analysis will be applied using descriptive statistics (eg, frequencies and central tendency measures) offering an overview of articles. Following the data extraction and organisation of data in EPPI Reviewer, the research team will review all teaching methods that meet the criteria from the predetermined definition, to conclude a definitive list of teaching methods and their descriptions. It is intended to complete a thematic analysis using NVivo,[45] with the extracted descriptions of the various teaching methods. Common characteristics within descriptions will be identified, as well as the setting of where presented methods are used and for what purpose (learning objective). Potential classification areas were assembled based on findings from online searches and education websites (online supplemental file 4).[1 8 46 47] These will be considered as classifications that may be merged with any new findings during the scoping review data collection and analysis phases. Different classifications are relevant in that they may offer a logical structure to underpin common characteristics for methods. Published literature investigating teaching methods that is based on group size (large group, small group and individual), responsible persons (instructor, peers, self-regulated learner, supervisor, etc), modes of delivery (online, onsite, distance, practice based) will be eligible. In the data collection phase, methods reported as effective will be documented. It is intended to conduct a thematic analysis of collated data. We will attempt to define specific characteristics that should be included within all descriptions of a teaching methods to be used as a basis to organise and group methods. A systematic and analytical approach will be used to extract information aligned to the data plan and expected outputs (online supplemental file 5). Regular meetings with the research team intend to address inconsistencies, and support researchers with specific questions as they arise.[38]

Once methods have been extracted with descriptions, and analysed, the research team will be able to discuss how best to classify methods within a taxonomy. Educational methods reported as effective, measured with a reported effect size based on interventions will be gathered in the data collection phase and reported in the final publication. It is possible that not all listed methods will have reported effect sizes as we expect results from grey literature.

Patient and public involvement

No patients were involved in the preparation of this study protocol.

Consultation

As a consecutive research step, teaching method descriptions will go through a consultation and consensus process with invited experts to refine and reduce descriptions to agreed definitions of terms, to validate findings from this scoping review. Discussions within the team have not yet established whether 'expert' should be searched from within the discipline of health professions education or try to extend beyond these boarders to other disciplines and include learners and patient representatives as experts.

DISCUSSION

This research will collate descriptions of methods, compare and contrast descriptions, and arrive at a single description through consultation. To complete this task, capturing characteristics of methods will be essential to identify patterns and commonalities across methods. The application of this research may well offer a solid foundation to new research investigating the effectiveness of teaching methods in health professions education, as well as shedding light to how teaching methods are described and used in health professions education.

Ethics and dissemination

Under the Swiss Ethical Review Act, this study does not require ethical clearance by a Cantonal Ethical Review Committee as it does not include primary empirical data on biological nor sensitive information collation (eg, population information, ethnicity). Ethical approval will be sought prior to launching the consultation phase of the research.

While ethical approval is not deemed necessary for this scoping review, aligned to proposed best practices in conducting reviews, the ethical considerations of reported studies selected for data extraction should be reported.[48] Following this best practice approach, specific information on reported ethical considerations from found published studies is included for data extraction (online supplemental file 3). This research will be disseminated through a peer-reviewed journal and presented at international conferences.

ORCID iDs
Sharon Mitchell http://orcid.org/0000-0002-3725-7366
Carolin Sehlbach http://orcid.org/0000-0001-9732-1377
Gregor H L Franssen http://orcid.org/0000-0003-2347-5095
Janusz Janczukowicz http://orcid.org/0000-0001-5576-6028

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