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Formative peer assessment in healthcare education programs – protocol for a scoping review

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ABSTRACT

Introduction: In formative peer assessment the students give and receive feedback from each other and expand their knowledge in a social context of interaction and collaboration. The ability to collaborate and communicate are essential parts of the healthcare professionals' competence and deliver of safe patient care. Thereby, it is of utmost importance to support students with activities fostering those competences during their healthcare education. The aim of the scoping review is to compile research on peer assessment presented in healthcare education programs, focusing formative assessment. The scoping review will act as a guide prior to develop a peer assessment intervention in a healthcare program.

Methods and analysis: The scoping review will be conducted by using the framework presented by Arksey & O'Malley and Levac et al. The primary research question is: How are formative peer assessment interventions delivered in healthcare education? The literature search will be conducted in the peer-reviewed databases PubMed, CINAHL, ERC and ERIC. Additional search will be performed in Google Scholar, hand-search reference lists of included studies and Libsearch for identification of grey literature. Two researcher will independently screen title and abstract. Full text articles will be screened by three researchers using a protocol. A flow diagram will present the included and excluded studies. A narrative review will be conducted by using content analysis. The findings will be presented under thematic headings using a summary table. To enhance validity, stakeholders from healthcare education programs and healthcare institutions will be provided with an overview of the preliminary results.

Ethics and dissemination: Research ethics approval is not required for the scoping review. The result of the scoping review will form the basis for developing and conducting an intervention focusing collaborative learning and peer assessment in a healthcare education program.

STRENGTH AND LIMITATIONS OF THE STUDY

- The result of the scoping review will establish a baseline for understanding the concept of formative peer assessment in healthcare education programs prior to developing an intervention focusing peer assessment in a healthcare education programme.
- A systematic search strategy will be conducted in four electronic databases with peer reviewed literature, including search in library databases for inclusion of books, e-books and grey literature.
- Search strategies will be developed in collaboration with a research librarian well versed in research databases.
- No formal quality assessment will be conducted as the scoping aims to provide a map of the landscape of formative peer assessment in healthcare education.
- Only articles and documents published in English will be included.

INTRODUCTION

Peer assessment is described as an essential part of collaborative learning since students exercise their ability to give and receive feedback.[1] This supports students in gaining insights and understanding of assessment criteria and their personal approach to an assessment task mirrored in a peer.[1] Furthermore, peer assessment helps students develop judgement skills, critiquing abilities and self-awareness.[1] It can be defined as "*an arrangement in which individuals consider the amount, level, quality, or success of the products or outcomes of learning of peers of similar status"*(p. 118).[2] Peer assessment has been described in a variety of contexts and with various aims including measuring professional competence of medical students[3], as a strategy to enhance students' engagement in their own learning[4-5], and development of employability skills for students in higher education.[6]

In a peer assessment activity, students take responsibility for assessing the work of their peers against set assessment criteria,[1] and can be conducted as summative or formative assessments. The purpose of summative assessment is the grading and evaluation of students´ learning.[7] On the other hand, formative assessment focus the development of the student learning process.[8] In formative peer assessment the intention is to help students help each other when planning their learning.[9] The students expand their knowledge in a social

context of interaction and collaboration according to social constructivism principles.[10-11] In this social context they identify their strengths and weaknesses and develop metacognitive, personal and professional skills.[9] It is conversational in nature[12] and fundamental is the use of feedback. Feedback is an integral aspect of peer assessment[7] with the intention to enhance student learning.[13]

A recent published review of assessment in higher education[14] raised the issue that studies on peer assessment are deficient in referring to exactly what peer assessment aims to achieve and in addition empirical investigations are missing (ibid). Boud et al.[1] highlighted the importance of a shift in assessment, from individualistic assessment approaches to peer assessment if collaboration such as manifested in collaborative learning models is to be fostered (ibid). Since the ability to collaborate, communicate, assess, give and receive feedback are essential parts of healthcare professionals' competence and delivery of safe patient care. Thereby, it is of utmost importance to support students with activities fostering those competences during their healthcare education. These competences are related to professional teamwork, as well as broader goals for lifelong learning, and as argued by Boud et al.[1] address course-specific goals not readily developed otherwise. Therefore, the scoping review of peer assessment in higher education will act as an important guide prior to develop an empirical investigation focusing peer assessment interventions in a healthcare education program.

METHOD

A scoping review aims to map the concepts, main sources and evidence available in a particular research area to get a broader understanding of a specific subject[15] and has increased in popularity in recent years in health- and social sciences.[16] Scoping reviews are often conducted as a preliminary investigative process that help the researchers to formulate a research question and develop research proposals[17] and as essential basis for curriculum development and program implementation.[18]

This scoping review will be conducted by using the York methodology by Arksey and O´Malley[15] and taking into consideration recommendations presented by Levac et al. [19]. A scoping review follows a six-stage process including: 1) Identifying a research question 2) Identifying relevant studies, 3) Study selection, 4) Charting the data, 5) Collating, summarizing and reporting the result, and 6) Consultation.[15,19] This six-

stage process associates with the process in conducting a systematic review. They both use rigorous and transparent methods to identify and analyse all the relevant literature pertaining to a research question[20] This scoping review does not aim to assess the quality and validity of the studies in order to synthesize best practice guidelines as in a systematic review. Rather, it aims to get a broad picture and to highlight recent efforts and key concepts of peer assessment as an integral component for students in higher education. Therefore, this scoping review need to include a greater range of methodologies and study designs than what would be possible in a systematic review, that often focus on randomized controlled trials.[15]

Furthermore, a scoping review can be of use when a topic is of a complex or heterogeneous nature[21] and as an essential basis for curriculum development and program implementation.[18] Since the literature on peer assessment is extensive and with some ambiguity in precise definitions[14] and conducted in varying contexts in higher education this method seemed appropriate to answer the research questions. In other words, peer assessment is multifaceted and a scoping review may provide the researchers with a broad and in depth knowledge of this particular subject. The reported result will be essential for conducting further development of an intervention aiming to implement and evaluate peer assessment as part of a collaborative learning approach in a healthcare education program.

Stage 1: Identifying the research question

The aim of this scoping review is to compile research about peer assessment presented in higher education, focusing formative assessment. The primary research question is:

- How are formative peer assessment interventions delivered in healthcare education?

Further questions to be answered are:

- What are the rationales for using formative peer assessment in healthcare education?
- What experiences of formative peer assessment are presented from the perspective of students and teachers in healthcare education and in what context (e.g. clinical practice, pre-clinical- and theoretical courses)?
- What outcomes are presented from formative peer assessment interventions?

Levac et al.[19] recommend a clear articulation of the research question. In a systematic review the question to guide the search is often based on the "Population Intervention Context Outcome" elements (PICO). Since a scoping review has less restrictive inclusion criteria than a systematic review the "Population Concept and Context" elements (PCC, table 1) can be used to establish an effective search criteria.[22]

Table 1. The PCC mnemonic as recommended by the Joanna Briggs Institute.[22]

Population	Concept	Context
Students assessing students	Intervention, rationale, outcome, context and experience of formative peer assessment	Healthcare education programs in higher education

Stage 2: Identifying relevant studies

The literature search will be conducted in the peer-reviewed databases, PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Education Research Complete (ERC) and Education Research Centre (ERIC). Search tools such as Medical Subject Headings (MeSH), Headings, Thesaurus and Boolean operators (AND/OR) will be used to expand and narrow the search. Additional search will be performed in Google Scholar, hand-search reference lists of included studies and Libsearch for identification of grey literature. No limitations will be set to the year of publication. Finally, search strategies will be developed in collaboration with a research librarian well versed in research databases.

Initially the search terms will be purposefully broad (e.g. peer assessment, higher education) in order to capture the range of published literature. However, the extensiveness of material will determine if more narrow inclusion criteria are necessary for managing the material. The following inclusion criteria will be applied in the search: a) the articles have to address peer assessment in higher education b) focusing formative peer assessment c) students in healthcare education programs d) peer reviewed articles, grey literature, books etc.

Since the distinction between different assessment terms and how different authors define peer assessment varies[14] related concepts to peer assessment (peer feedback, peer evaluation, peer observation, peer reflection etc.) will be incorporated in the search to ensure that no study is missed due to ambiguity in definition of the subject.

Articles including summative peer assessment will be excluded unless the study involves formative assessment. However, a distinction between the two must be transparent if the study is to be included. If there is any uncertainty the study will be excluded. Furthermore, full articles, abstracts, conference posters, or power point presentations unavailable for review will be excluded.

Stage 3: Study selection

Initially the title and abstract will be screened by two members of the research team. The team may at this stage need to discuss the inclusion and exclusion criteria and refine the search.[19] If the title is in line with the review purpose the abstract will be read. This procedure will be conducted by two researchers separately and guided by the inclusion criteria and research question. If any disagreement appears, a third research member will be consulted. This initial step will determine whether the criteria captures relevant studies. Secondly, the full-text articles will be imported into the web-based bibliographic manager RefWorks 2.0 to enable easily removal of duplicates and for organizational feasibility. Each paper will be given a unique number for easily identification and to keep track of included and excluded articles.[23]

Stage 4: Charting the data

The full-text articles will be screened by three researchers independently. For managing the documentation of extracted data from the included studies a charting form will be used. The protocol will include the inclusion criteria and an explanation of why the study is included or excluded at this stage in the process. If there are any reservations or discordant opinions a fourth researcher will be consulted until consensus is reached. To enable replications by others, increase reliability of the findings and for methodological accuracy[15] the process will be documented in a flow diagram using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) as presented by Moher et al.[24] and recommended by Pham et al.[16]

Stage 5: Collating, summarising and reporting results

Collating and managing the results from the included articles will be conducted by using a data analysis software program, NVivo 11. NVivo is a code-based system developed to support structured qualitative data.[25] Even though, the analysis part of the data material

needs to be abstracted by the researcher, the software may support an overview of codes, themes and their relationships and connections.[25]

The data will undergo a narrative review using an inductive methodology. Analysing the data will be conducted by using the general principles for content analysis as presented by Bengtsson.[26] Content analysis allows a large amount of data, includes all types of written text. To maintain quality and trustworthiness each stage of the data analysis will be presented in a scheme.[26] The findings will be presented under thematic headings using a summary table which can inform a description of key points. Detailed tables will present: a) author (s) b) the geographical distribution of studies c) year of publication d) educational interventions presented e) the professional healthcare program that the studies refers to f) reported experiences, outcome and main findings of peer assessment initiatives and g) research methodology.

Stage 6: Consultation

Consultation is an optional stage,[15] however, since it adds methodological rigor[19] it will be incorporated in the scoping review. The consultation will be conducted when preliminary results are organised in charts and tables (stage 5). Stakeholders from healthcare education programs (students and teachers) and healthcare institutions (preceptors) will be provided with an overview of the preliminary results. The purpose of the consultation is to enhance the validity of the study outcome and to facilitate appropriate dissemination of outputs.

ETHICS AND DISSEMINATION

Research ethics approval is not required for the scoping review. Information will only be extracted from public databases. The result of this scoping protocol will form the basis for conducting a scoping review of formative peer assessment in a healthcare education program. The results will be presented at national and international conferences and published in peer-reviewed journal and will be of interest for healthcare and academics institutions.

Authors' Contribution: MS led the design, search strategy and conceptualization of this work and drafted the protocol. EM, MB and EC were involved in the conceptualization of the review design, inclusion and exclusion criteria and provided feedback on the methodology and the manuscript. All authors give their approval to the publishing of this protocol manuscript.

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Competing interests: None declared

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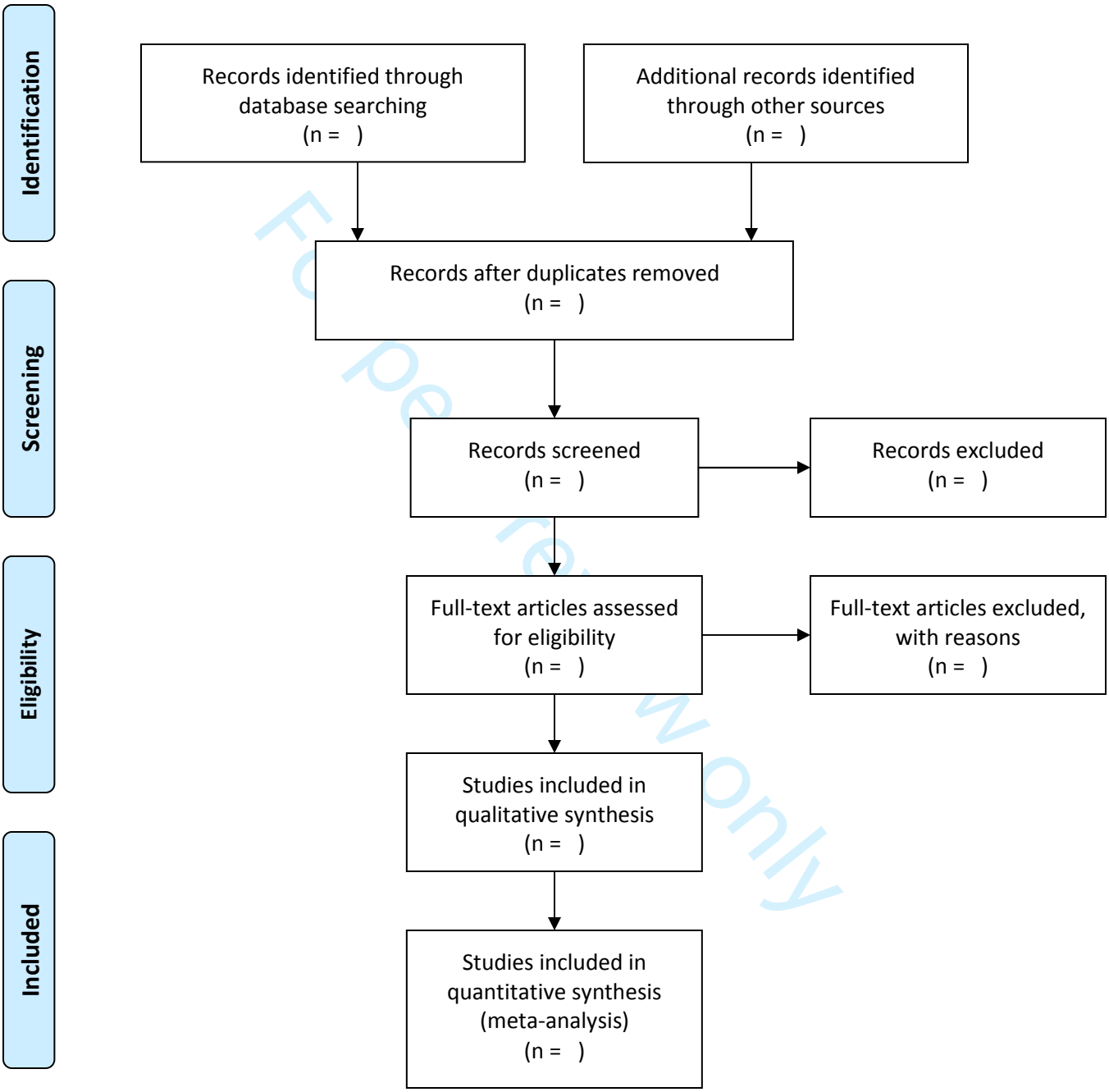
PRISMA 2009 Flow Diagram



From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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ABSTRACT

Introduction: In formative peer assessment the students give and receive feedback from each other and expand their knowledge in a social context of interaction and collaboration. The ability to collaborate and communicate are essential parts of the healthcare professionals' competence and delivery of safe patient care. Thereby, it is of utmost importance to support students with activities fostering these competences during their healthcare education. The aim of the scoping review is to compile research on peer assessment presented in healthcare education programs, focusing formative assessment. The result of the scoping review will form the basis for developing and conducting an intervention focusing collaborative learning and peer assessment in a healthcare education program.

Methods and analysis: The scoping review will be conducted by using the framework presented by Arksey & O'Malley and Levac et al. The primary research question is: How are formative peer assessment interventions delivered in healthcare education? The literature search will be conducted in the peer-reviewed databases PubMed, CINAHL, ERC and ERIC between September and December 2018. Additional search will be performed in Google Scholar, hand-searching of reference lists of included studies and Libsearch for identification of grey literature. Two researchers will independently screen title and abstract. Full text articles will be screened by three researchers using a charting form. Studies meeting the inclusion criteria will be critical evaluated using the Critical Appraisal Skills Programme. A flow diagram will present the included and excluded studies. A narrative synthesis will be conducted by using thematic analysis as presented by Braun and Clarke. The findings will be presented under thematic headings using a summary table. To enhance validity, stakeholders from healthcare education programs and healthcare institutions will be provided with an overview of the preliminary results.

Ethics and dissemination: Research ethics approval is not required for the scoping review.

STRENGTH AND LIMITATIONS OF THE STUDY

- The result of the scoping review will establish a baseline for understanding the concept of formative peer assessment in healthcare education programs prior to developing an intervention focusing peer assessment in a healthcare education programme.
- A systematic search strategy will be conducted in four electronic databases with peer reviewed literature, including search in library databases for inclusion of books, e-books and grey literature.
- Search strategies will be developed in collaboration with a research librarian well versed using research databases.
- No formal quality assessment will be conducted as the scoping review aims to provide a map of the landscape of formative peer assessment in healthcare education.
- Only articles and documents published in English will be included.

INTRODUCTION

Peer assessment is described as an essential part of collaborative learning since students exercise their ability to give and receive feedback.[1] This supports students in gaining insights and understanding of assessment criteria and their personal approach to an assessment task mirrored in a peer.[1] Furthermore, peer assessment helps students to develop judgement skills, critiquing abilities and self-awareness.[1] It can be defined as "*an arrangement in which individuals consider the amount, level, quality, or success of the products or outcomes of learning of peers of similar status"*(p. 118).[2] Peer assessment has been described in a variety of contexts and with various aims including measuring professional competence of medical students[3], as a strategy to enhance students' engagement in their own learning[4-5], and development of employability skills for students in higher education.[6]

In a peer assessment activity, students take responsibility for assessing the work of their peers against set assessment criteria,[1] and can be conducted as summative or formative assessments. The purpose of summative assessment is the grading and evaluation of students´ learning.[7] On the other hand, formative assessment focus the development of students' learning processes.[8] In formative peer assessment the intention is to help students help each other when planning their learning.[9] The students expand their knowledge in a social

context of interaction and collaboration according to social constructivism principles.[10-11] In this social context they identify their strengths and weaknesses and develop metacognitive, personal and professional skills.[9] It is conversational in nature[12] and fundamental is the use of feedback. Feedback is an integral aspect of peer assessment[7] with the intention to enhance student learning.[13]

A recent published review of assessment in higher education[14] raised the issue that studies on peer assessment are deficient in referring to exactly what peer assessment aims to achieve and in addition empirical investigations are missing. Boud et al.[1] highlighted the importance of a shift in assessment, from individualistic assessment approaches to peer assessment if collaboration such as manifested in collaborative learning models is to be fostered. Since the ability to collaborate, communicate, assess, give and receive feedback are essential parts of healthcare professionals' competence and delivery of safe patient care. Thereby, it is of utmost importance to support students with activities fostering those competences during their healthcare education. These competences are related to professional teamwork, as well as broader goals for lifelong learning, and as argued by Boud et al.[1] address course-specific goals not readily developed otherwise. Therefore, the scoping review of peer assessment in higher education will act as an important guide prior to develop an empirical investigation focusing peer assessment interventions in a healthcare education program.

METHOD

A scoping review aims to map the concepts, main sources and evidence available in a particular research area to get a broader understanding of a specific subject[15] and has increased in popularity in recent years in health- and social sciences.[16] Scoping reviews are often conducted as a preliminary investigative process that help the researchers to formulate a research question and develop research proposals[17] and as essential basis for curriculum development and program implementation.[18]

This scoping review will be conducted by using the York methodology by Arksey and O´Malley[15] and taking into consideration recommendations presented by Levac et al. [19]. A scoping review follows a six-stage process including: 1) Identifying a research question 2) Identifying relevant studies, 3) Study selection, 4) Charting the data, 5) Collating, summarizing and reporting the result, and 6) Consultation.[15,19] This six-

stage process associates with the process in conducting a systematic review. They both use rigorous and transparent methods to identify and analyse all the relevant literature pertaining to a research question.[20] This scoping review does not aim to assess the quality and validity of the studies in order to synthesize best practice guidelines as in a systematic review. Rather, it aims to get a broad picture and to highlight recent efforts and key concepts of peer assessment as an integral component for students in higher education. Therefore, this scoping review need to include a greater range of methodologies and study designs than what would be possible in a systematic review, that often focus on randomized controlled trials.[15]

Furthermore, a scoping review can be of use when a topic is of a complex or heterogeneous nature[21] and as an essential basis for curriculum development and program implementation.[18] Since the literature on peer assessment is extensive and with some ambiguity in precise definitions[14] and conducted in varying contexts in higher education this method seemed appropriate to answer the research questions. In other words, peer assessment is multifaceted and a scoping review may provide the researchers with a broad and in depth knowledge of this particular subject. The reported result will be essential for conducting further development of an intervention aiming to implement and evaluate peer assessment as part of a collaborative learning approach in a healthcare education program.

Stage 1: Identifying the research question

The aim of this scoping review is to compile research about peer assessment presented in higher education, focusing formative assessment. The primary research question is:

- How are formative peer assessment interventions delivered in healthcare education?

Further questions to be answered are:

- What are the rationales for using formative peer assessment in healthcare education?
- What experiences of formative peer assessment are presented from the perspective of students and teachers in healthcare education and in what context (e.g. clinical practice, pre-clinical- and theoretical courses)?
- What outcomes are presented from formative peer assessment interventions?

Levac et al.[19] recommend a clear articulation of the research question. In a systematic review the question to guide the search is often based on the "Population Intervention Context Outcome" elements (PICO). Since a scoping review has less restrictive inclusion criteria than a systematic review the "Population Concept and Context" elements (PCC, table 1) can be used to establish effective search criteria.[22]

Table 1. The PCC mnemonic as recommended by the Joanna Briggs Institute.[22]

Population	Concept	Context
Students assessing students	Intervention, rationale, outcome, context and experience of formative peer assessment	Healthcare education programs in higher education

Stage 2: Identifying relevant studies

The literature search will be conducted in the peer-reviewed databases, PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Education Research Complete (ERC) and Education Research Centre (ERIC). Search tools such as Medical Subject Headings (MeSH), Headings, Thesaurus and Boolean operators (AND/OR) will be used to expand and narrow the search. Additional search will be performed in Google Scholar, hand-search reference lists of included studies and Libsearch for identification of grey literature. The search will be conducted between September and December, 2018. No limitations will be set to the year of publication. Finally, search strategies will be developed in collaboration with a research librarian well versed in research databases.

Inclusion and exclusion criteria

The following inclusion criteria will be applied in the search: a) the articles have to address peer assessment in higher education b) focusing formative peer assessment c) students in healthcare education programs d) peer reviewed articles, grey literature, books etc. e) studies evaluated with moderate or high methodological quality according to the Critical Appraisal Skills Programme (CASP).[23] Initially the search terms will be purposefully broad (e.g. peer assessment, higher education) in order to capture the range of published literature. However, the extensiveness of material will determine if more narrow inclusion criteria are necessary for managing the material.

Since the distinction between different assessment terms and how different authors define peer assessment varies,[14] similar concepts related to peer assessment for example, peer feedback and peer evaluation, will be incorporated in the search to ensure that no study is missed due to ambiguity in definition of the subject.

Articles including summative peer assessment will be excluded unless the study involves formative assessment. However, a distinction between the two must be transparent if the study is to be included. If there is any uncertainty the study will be excluded. Furthermore, full articles, abstracts, conference posters, or power point presentations unavailable for review will be excluded.

Stage 3: Study selection

Initially the title and abstract will be screened by two members of the research team. The team may at this stage need to discuss the inclusion and exclusion criteria and refine the search.[19] If the title is in line with the review purpose the abstract will be read. This procedure will be conducted by two researchers separately, guided by the inclusion criteria and research questions. If any disagreement appears, a third research member will be consulted. This initial step will determine whether the criteria capture relevant studies. Further, the full-text articles will be imported into the web-based bibliographic manager RefWorks 2.0 to enable removal of duplicates and for organizational feasibility. Each paper will be given a unique number for identification and to keep track of included and excluded articles.[24]

Stage 4: Charting the data

The full-text articles will be screened by three researchers independently. A charting form will be used for managing the documentation of extracted data from the included studies. The charting form will include the inclusion criteria and an explanation of why the study is included or excluded at this stage in the process. If there are any reservations or discordant opinions a fourth researcher will be consulted until consensus is reached. Studies meeting the inclusion criterias will be critical evaluated using CASP.[23] The methodological quality will be graded with moderate when meeting 6-8 criteria and high 9-10 criteria of the CASP checklist.[25]To enable replications by others, increase reliability of the findings and for methodological accuracy[15] the process will be documented using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) presented by Moher et al.[26] The PRISMA flow diagram visualise selection process of included and excluded articles

during each stage of the search process. The PRISMA checklist will support rigor report of the review using the 24 item checklist.[26]

Stage 5: Collating, summarising and reporting results

Collating and managing the results from the included articles will be conducted by using a data analysis software program, NVivo 11. NVivo is a code-based system developed to support structured qualitative data.[27] Even though, the analysis part of the data material needs to be abstracted by the researcher, the software may support an overview of codes, themes and their relationships and connections.[27]

We will perform a narrative synthesis using an inductive methodology. Analysing the qualitative data will be conducted by using the principles for thematic analysis as presented by Braun and Clarke.[28] Thematic analysis is a method for identifying, analysing and reporting patterns within data [28] and has a both qualitative and quantitative methodology. [29] It allows a large amount of data and can highlight differences and similarities across a data set. The themes will be identified at a semantic level from the written text.[28] To maintain quality and trustworthiness each stage of the data analysis will be presented in a scheme.[28] The findings will be presented under thematic headings using a summary table which can inform a description of key points. Further, detailed tables will present: a) author (s) b) the geographical distribution of studies c) year of publication d) educational interventions presented e) the professional healthcare program that the studies refers to f) reported experiences, outcome and main findings of peer assessment initiatives and g) research methodology.

Stage 6: Consultation

Consultation is an optional stage,[15] however, since it adds methodological rigor[19] it will be incorporated in the scoping review. The consultation will be conducted when preliminary results are organised in charts and tables (stage 5). Stakeholders from healthcare education programs (students and teachers) and healthcare institutions (preceptors) will be provided with an overview of the preliminary results. The purpose of the consultation is to enhance the validity of the study outcome.

ETHICS AND DISSEMINATION

Research ethics approval is not required for a scoping review. Information will only be extracted from public databases. The result of this scoping protocol will form the basis for

conducting a scoping review of formative peer assessment in a healthcare education program. The results will be presented at national and international conferences and published in peer-reviewed journals.

Authors' Contribution: MS led the design, search strategy and conceptualization of this work and drafted the protocol. EM, MB and EC were involved in the conceptualization of the review design, inclusion and exclusion criteria and provided feedback on the methodology and the manuscript. All authors give their approval to the publishing of this protocol manuscript.

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Patient and/or public involvement: None

Competing interests: None declared

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PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) 2015 checklist: recommended items to address in a systematic review protocol*

Section and topic	Item No	Checklist item
ADMINISTRATIVE INFORMATION		
Title:		
Identification	1a	Formative peer assessment in healthcare education programs – protocol for a scoping review (p.1)
Update	1b	No
Registration	2	Not registered.
Authors:		
Contact	3a	Corresponding author: Marie Stenberg, Faculty of Health and Society, Jan Waldenströmsg 25, Malmö University, SE 214 28 Malmö, Sweden Tel: +46 40 665 79 44 E-Mail: marie.stenberg@mau.se Co-authors: Elisabeth Mangrio, Faculty of Health and Society, Malmö University, Sweden E-mail: Elisabeth.mangrio@mau.se Mariette Bengtsson, Faculty of Health and Society, Malmö University, Sweden E-mail: mariette.bengtsson@mau.se Elisabeth Carlson, Faculty of Health and Society, Malmö University, Sweden E-mail: Elisabeth.carlson@mau.se (p.1)
Contributions	3b	MS led the design, search strategy and conceptualization of this work and drafted the protocol. EM, MB and EC were involved in the conceptualization of the review design, inclusion and exclusion criteria and provided feedback on the methodology and the manuscript. All authors give their approval to the publishing of this protocol manuscript. (p.9)
Amendments	4	If we need to amend this protocol, we will give the date of each amendment, describe the change and give the rationale in this section. Changes will not be incorporated into the protocol
Support:		
Sources	5a	This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors. (p.9)
Sponsor	5b	No funding has been received for this study (p.9)
Role of sponsor or funder	5c	None
INTRODUCTION		

Rationale	6	Formative peer assessment in healthcare education programs – protocol for a scoping review In formative peer assessment the students give and receive feedback from each other and expand their knowledge in a social context of interaction and collaboration. The ability to collaborate and communicate are essential parts of the healthcare professionals' competence and delivery of safe patient care. Thereby, it is of utmost importance to support students with activities fostering those competences during their healthcare education. The aim of the scoping review is to compile research on peer assessment presented in healthcare education programs, focusing formative assessment. The scoping review will act as a guide prior to developing a peer assessment intervention in a healthcare program. (p.4)
Objectives	7	The aim of this scoping review is to compile research about peer assessment presented in higher education, focusing formative assessment. The primary research question is: • How are formative peer assessment interventions delivered in healthcare education? Further questions to be answered are: • What are the rationales for using formative peer assessment in healthcare education? • What experiences of formative peer assessment are presented from the perspective of students and teachers in healthcare education and in what context (e.g. clinical practice, pre-clinical- and theoretical courses)? • What outcomes are presented from formative peer assessment interventions?

Population	Concept	Context
Students assessing students	Intervention, rationale, outcome, context and experience of formative peer assessment	Healthcare education programs in higher education

(p. 5 and 6)

METHODS

Eligibility criteria	8	The following inclusion criteria will be applied in the search: a) the articles have to address peer assessment in higher education b) focusing formative peer assessment c) students in healthcare education programs d) peer reviewed articles, grey literature, books etc. Since the distinction between different assessment terms and how different authors define peer assessment varies, related concepts to peer assessment (peer feedback, peer evaluation, peer observation, peer reflection etc.) will be incorporated in the search to ensure that no study is missed due to ambiguity in definition of the subject. Articles including summative peer assessment will be excluded unless the study involves formative assessment. However, a distinction between the two must be transparent if the study is to be included. If there is any uncertainty the study will be excluded. Furthermore, full articles, abstracts, conference posters, or power point presentations unavailable for review will be excluded. No limitations will be set to the year of publication. Limitation in language is set to English and Swedish. (p.6 and 7)
Information sources	9	The literature search will be conducted in the peer-reviewed databases, PubMed, Cumulative Index to Nursing and Allied

		Health Literature (CINAHL), Education Research Complete (ERC) and Education Research Centre (ERIC). Search tools such as Medical Subject Headings (MeSH), Headings, Thesaurus and Boolean operators (AND/OR) will be used to expand and narrow the search. Additional search will be performed in Google Scholar, hand-search reference lists of included studies and Libsearch for identification of grey literature. The search will be conducted between September and December 2018. No limitations will be set to the year of publication. Finally, search strategies will be developed in collaboration with a research librarian well versed in research databases. (p.6)
Search strategy	10	Draft of search strategy in Pub Med #1 (MESH) Feedback OR Judgement* OR Collaboration OR Intersectional collaboration OR Formative Feedback* OR Cooperative Behaviour OR Educational Measurement OR (Free text) "peer assessment" OR Peer feedback OR Peer assessment OR Peer-assessment OR Peer review OR Peer chart review OR Peer assess* OR Peer-to-peer OR Peer observation OR Peer* OR Peer rating* OR Near-peer Peer ranking* OR Peer evaluation* OR Peer examiner* OR peer-to-peer discourse OR Peer grade* OR Peer marking #2 (MESH) Education, Graduate OR Education, Professional OR Higher Education Undergraduate study OR (Free text) "higher education" OR Academic education #3 (MESH) Formative feedback OR Constructive feedback OR (Free text) formative OR Formative assessment OR Formative assess* #4 (MESH) Students OR Students, Premedical OR Students, Nursing OR Students, Medical OR Students, Dental OR Students, Healthcare Occupations OR (Free text) students OR University students #1 AND #2 AND #3 AND #4 Search will be conducted between September and December 2018. (p. 6)
Study records:		
Data management	11a	The full-text articles will be imported into the web-based bibliographic manager RefWorks 2.0 to enable removal of duplicates and for organizational feasibility. Each paper will be given a unique number for identification and to keep track of included and excluded articles. (p. 7)
Selection process	11b	The title and abstract will be screened by two members of the research team. The team may at this stage need to discuss the inclusion and exclusion criteria and refine the search. If the titles are in line with the review purpose the abstract will be read. This procedure will be conducted by two researchers separately and guided by the inclusion criteria and research questions. If any disagreement appears, a third research member will be consulted. The full-text articles will be screened by three researchers independently. For managing the documentation of extracted data from the included studies a charting form will be used. The charting form will include the inclusion criteria and an explanation of why the study is included or excluded at this stage in the process. If there are any reservations or discordant opinions a fourth researcher will be consulted until consensus is reached. (p.7)
Data collection process	11c	For managing the documentation of extracted data from the included studies a charting form will be used. The charting form will include the inclusion criteria and an explanation of why the study is included or excluded at this stage in the process. If there are any reservations or discordant opinions a fourth researcher will be consulted until consensus is reached. (p. 7)
Data items	12	Detailed tables will present: a) author (s) b) the geographical distribution of studies c) year of publication d) educational

		interventions presented e) the professional healthcare program that the studies refers to f) reported experiences, outcome and main findings of peer assessment initiatives and g) research methodology. (p.8)
Outcomes and prioritization	13	The result of the scoping review will form the basis for developing and conducting an intervention focusing collaborative learning and peer assessment in a healthcare education program. Therefore, the main prioritization ~~is~~ are outcomes presented in intervention studies to enable to answer the research question: 'How are formative peer assessment interventions delivered in healthcare education?' and 'What outcomes are presented from formative peer assessment interventions?' Furthermore, studies presenting results of experiences and rationales of using peer assessment to answer the questions: • What are the rationales for using formative peer assessment in healthcare education? • What experiences of formative peer assessment are presented from the perspective of students and teachers in healthcare education and in what context (e.g. clinical practice, pre-clinical- and theoretical courses)? This may provide the research team with a broad knowledge of peer assessment in healthcare education programs before planning and proceeding with further interventions in this area. (p.5 and 6)
Risk of bias in individual studies	14	Studies meeting the inclusion criteria will be critical evaluated using Critical Appraisal Skills Programme (CASP). The methodological quality will be graded moderate when meeting 6-8 criteria and high 9-10 of the CASP checklist. (p. 7)
Data synthesis	15a	Both qualitative and quantitative data will be synthesised using the thematic methodology as presented by Braun and Clarke. (p 8)
	15b	This scoping review will not conduct any meta-analysis.
	15c	None additional analyses will be conducted.
	15d	A narrative synthesis will be provided. Information will be presented in text and tables to summarise and explain the characteristics and findings of the included studies. (p.8)
Meta-bias(es)	16	The PRISMA-P and PRISMA guidance will be utilized. Included primary research will be assessed for bias. Studies with statistically non-significant or negative results will not be excluded. (p. 7 and 8)
Confidence in cumulative evidence	17	Not applicable for this scoping review protocol

*** It is strongly recommended that this checklist be read in conjunction with the PRISMA-P Explanation and Elaboration (cite when available) for important clarification on the items. Amendments to a review protocol should be tracked and dated. The copyright for PRISMA-P (including checklist) is held by the PRISMA-P Group and is distributed under a Creative Commons Attribution Licence 4.0.**

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