What do we mean by “transferable skills”? A literature review of how the concept is conceptualized in undergraduate health sciences education

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Published in:
Higher Education, Skills and Work-Based Learning

DOI:
10.1108/HESWBL-01-2020-0012

Publication date:
2020

Document version
Accepted manuscript

Citation for published version (APA):
WHAT DO WE MEAN BY ‘TRANSFERABLE SKILLS’? A LITERATURE REVIEW OF HOW THE CONCEPT IS CONCEPTUALIZED IN UNDERGRADUATE HEALTH SCIENCES EDUCATION

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<th>Journal:</th>
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<td>Manuscript ID</td>
<td>HESWBL-01-2020-0012.R1</td>
</tr>
<tr>
<td>Manuscript Type:</td>
<td>Literature Review</td>
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<tr>
<td>Keywords:</td>
<td>health science education, higher education, literature review, transfer, generic skills, Employability</td>
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Response to review

Dear Editor, dear reviewers,

We are grateful for the comments and insightful suggestions from the two reviewers and the editor. Your careful reading and feedback have given us the opportunity to engage in an educative process in the rewriting the paper, and we really appreciate the many encouraging and challenging comments. We have done our best to improve the paper according to the suggestions, and we hope the following response to the reviewer’s comments meet the expectations and standards for a paper to be published in *Higher Education, Skills and Work-Based Learning*. If you have any questions or further comments, please do not hesitate to contact us again and we will be happy to respond.

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<th>Reviewer 1</th>
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<tr>
<td>1. Originality: On balance this paper seems to be offer important insights into an area of ambiguity-the lack of clarity re the concept of transferable skills. There are however for me a few areas which require revision; The abstract claims the paper is a systematic review but then also uses the term mixed studies literature review. Surely a literature review by its very nature has a mixture of studies, grey literature etc so I would suggest consistency re the use of terms.</td>
<td>In order to avoid any confusion or misunderstanding of our review, the word “systematic” is deleted in the abstract, the introduction and the method section. The mixed studies literature review is the correct term to use in this study, since we apply the type of literature review described by Pluye and Hong (2014).</td>
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<td>Grammatically, the abstract is very 'wordy' and in need of a proof read.</td>
<td>The whole paper has now been proof read. See the attached certificate from VidKom.</td>
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I am a bit confused re the use of the term health sciences education, which seems to be used as a bit of a catch all and then is not elaborated upon, clarified or justified sufficiently in the introduction- this is a theme I will return to throughout my comments.

What is health sciences education, is this the correct term to use and why health sciences? Do you need to clarify this is UG education only? - I think I only realised this at the conclusion?

Thank you for reminding us of our blind spots. We (the authors) come from an academic tradition where health sciences education is the broader term for a large variety of healthcare, health professional and health science education programs. Thus, we were not aware that this term could be misunderstood. In order to clarify what we mean by health sciences education (HSE), we have added an explanation in the introduction (see page 9, yellow text). The explanation is inspired by one of the most estimated journals within the field of health sciences education: *Advances in Health Sciences Education*.

In addition, we have added a sentence in the results section (page 9, before “Emerging Themes”, see yellow text) about the dominance of healthcare and health professionals’ education, especially medicine and nursing.

2. Relationship to Literature:

I believe this is a valuable study which currently is hampered by a number of the comments I have mentioned above.

In the section on the purpose of the study there is scant mention to the health workforce - this requires clarification. I think this could be solved by focusing on the healthcare workforce?

The section “Purpose of the Present Study” is now improved and includes further explanation of the purpose and the relevance of the study to healthcare workforce (see page 5, yellow text).
Furthermore the majority of the papers included in the review relate to the healthcare workforce, doctors and nurses in particular (68%)?

See the added sentence in the results section (page 9, before “Emerging Themes”, see yellow text) about the relevance of the results for healthcare and health professionals education.

The rationale offered re demographics of an ageing population etc is an old reference and requires further explanation. Here there are age differences by cohort and effects upon both health and social care.

We have added new references to the section “Purpose of the Present Study” (page 5, yellow text) but kept the references from The Lancet and New England Journal of Medicine because they are good and highly relevant articles for this study.

3. Methodology:

I think if the health sciences vs healthcare science issue is resolved the research question changed the search strategy and implementation appears to be robust.

We have explained the definition of health sciences education above, in the introduction (page 2-3, yellow text), in “Purpose of the Present Study” (page 5, yellow text) and included a sentence in the results section (page 9, before “Emerging Themes”, see yellow text), which should align the research question, the method (in particular the chosen search terms and the inclusion of studies) and the results in a better way.

I think the authors have been too hard on themselves in the limitations section.

Thank you – we understand you comment as a praise. However, we see no reason to change this section, as we believe it includes important considerations we have had during the study.

The presentation of the results were an interesting read. In relation to the issues (I am sorry to keep coming back to this) I am just finding it difficult to generalise to health sciences when the majority of the studies are

See the added sentence in the results section (page 9, before “Emerging Themes”, see yellow text) about the relevance of the results for healthcare workers and health professionals’ education.
health care. The implications of the review are therefore more applicable to this area and no so easily transferred to sports science for example (which is health science, as I understand it)?

4. Results:
The authors have presented and discussed the results in a thematic manner, and I found this section to be an interesting read.

Thank you 😊

5. Implications for research, practice and/or society:
The points I have made earlier need to be addressed for any conclusion to be relevant to either healthcare or health sciences education. As it stands, based on the papers included in the review, this has more relevance to healthcare.

Claims are made in the paper re the health workforce- but no mention of this in the conclusion.

The conclusion is very brief generally?

In the “introduction”, we have added a detailed description of the term health sciences education (see page 2-3, yellow text), and in the “Purpose of the Present Study” (page 5, yellow text) we have elaborated on the relevance of the study.

Regarding the conclusion, we acknowledge this reviewer’s critique and thus merged the “Perspectives” and “Conclusion” into one main section called “CONCLUSIONS AND PERSPECTIVES” (page 18-20, yellow text) in order to address the relevance of our study to healthcare professionals.

6. Quality of Communication: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal’s readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.:

The whole paper has now been proof read. See the attached certificate from VidKom.
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<th>The paper needs a robust proofread and edit. Some sentences are 'clumsy' for eg, the same word in the same sentence? The opening two sentences of the abstract - I found this wordy?</th>
<th>Do the title, keywords, abstract adequately reflect the paper’s content? Readers will locate, and potentially cite, the article based on these words - they are crucial: No If you have answered No, please provide feedback below and suggest alternative titles and keywords if appropriate.: For me its to sort out of this is health sciences or health care education? Oh, also make the point this is UG</th>
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<td>As described in “Purpose of the Present Study” (see page 5, line 5) and in the Method section subtitle “Stage 2: Eligibility Criteria” (line 18-21), our purpose was not to focus on healthcare workers. However, the results of our study turned out to be representative of and concentrated in healthcare and health professionals’ education, especially medicine and nursing (see “Results”, page 9 line 10-17, and “Conclusion and Perspectives”, page 18 line 15-23, page 19 line 4, and line ). Regarding UG: we have added “undergraduate” to the title.</td>
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<td>Do you feel the paper gives adequate international coverage (if appropriate)? Please provide details if possible.: I am thinking yes.</td>
<td>OK</td>
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<td>Would this paper be of interest to an international audience? Please provide details if possible: Possibly if the authors address the issues of clarity and justification/purpose.</td>
<td>In the “Purpose of the Present Study” (page 5, yellow text) we have elaborated on the relevance of the study, and by merging the perspectives and the conclusions we have made a clearer justification of the study. Also, we believe that the proof reading of the paper has improved the clarity and readability of the paper.</td>
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<td>Reviewer 2</td>
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<td>Do you feel the paper gives adequate international coverage (if appropriate)? Please provide details if possible. Yes, I think so but this needs to be in context how of the health delivery systems and health education programmes as they are delivered differently globally and the language used in this paper may not apply.</td>
<td>We acknowledge that there might by a language bias because we conducted the literature search in English. We were aware of this problem when we included or excluded studies during the screening proces. However, it was a criterion that the included studies were written in English. Therefore, the authors of the included studies have themselves translated the educational level into Anglo American standards. Of course, there may be countries where there is no precise and comprehensive term that matches the English designations. But since all the studies have been published in a peer-reviewed journal, there has been a quality control of the translation.</td>
</tr>
<tr>
<td>Would this paper be of interest to an international audience? Please provide details if possible: as above.</td>
<td>We believe that the research theme of this review is relevant internationally. Furthermore, it is relevant to mention that the Bologna Declaration (1999) sought to bring more coherence to higher education systems across Europe. However, the Declaration was for most countries first implemented around 2008. Since most of the studies were published after 2008, comparing studies from different European countries has been a relatively simple task.</td>
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This document certifies that the manuscript entitled

**WHAT DO WE MEAN BY ‘TRANSFERABLE SKILLS’? A LITERATURE REVIEW OF HOW THE CONCEPT IS CONCEPTUALIZED IN HEALTH SCIENCES EDUCATION**

Authored by

**Kristoffer Brix Olesen**

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WHAT DO WE MEAN BY ‘TRANSFERABLE SKILLS’? A LITERATURE REVIEW OF HOW THE CONCEPT IS CONCEPTUALIZED IN UNDERGRADUATE HEALTH SCIENCES EDUCATION

ABSTRACT

**Purpose:** Due to rapid changes in the future labor market, transferable skills are recognized as a vital learning outcome for students in undergraduate higher education. However, ambiguities surrounding the concept and content of transferable skills hampers the actual teaching and learning of transferable skills. Consequently, there is a great need for an overview of the literature on transferable skills to qualify and develop our approaches to transferrable skills in higher education. This study aims to outline a typology of how transferable skills are conceptualized in health sciences education, that is medicine, nursing and related health professionals education.

**Design:** The study was a mixed studies literature review, which included quantitative, qualitative, and mixed-methods studies. A seven-stage sequential exploratory synthesis of the included studies was conducted.

**Findings:** This review showed that transferable skills reflected three main conceptualizations: Program Requirements, Employability, and Holistic Development.

Overall, the global methodological quality of the empirical studies of interventions to further transferable skills development in health science education was weak.

**Practical implications:** By distinguishing between three main conceptualizations of transferable skills, this study’s typology supports alignment in transferable skills curricula because conceptually sound learning objectives provide teachers and students in health sciences educations with a clear purpose, and direct educators’ choice of relevant teaching and assessment strategies.
Research implications: Last, but not least, this study aids clear conceptualization in future empirical studies.

Originality: This review – the first of its kind – contributes to conceptualization of transferable skills as the basis for curriculum development and research.

Keywords: health science education; higher education; literature review; transfer; generic skills; employability.

INTRODUCTION

Due to rapid changes in the future labor market, transferable skills are widely recognized as a vital learning outcome for students in higher education (European Union, 2011; European Union, 2016; OECD, 2016; Universities UK, 2018; Succi, & Canovi, 2019). Transferable skills are assumed an essential prerequisite for developing graduates’ adaptability, flexibility, and employability, affording them the opportunity to rapidly adapt to future change (Jones et al., 2010; EU, 2016; Succi, & Canovi, 2019). However, the conceptual vagueness and ambiguity concerning both the concept and the content of transferable skills hamper the actual teaching and learning of transferable skills (Kember et al., 2007; Green et al., 2009; Jääskelä et al., 2018). The lack of conceptual alignment and the lack of content specificity also threaten evaluation and empirical investigation of transferable skills (Strijbos et al., 2015; Chan et al., 2017). Consequently, there is a great need for a overview of the literature on transferable skills to support students’ development of such skills. This mixed studies literature review (Pluye and Hong, 2014) outlines a typology of how transferable skills are conceptualized and empirically investigated in the field of health sciences education (HSE), that is the bachelors and/or
masters level of educational programs within healthcare, health profession and health sciences such as medicine, nursing, occupational therapy, physiotherapy, nutrition and related disciplines such as sports science and public health.

Transferable Skills – An Overview

Although the concept of transferable skills is a phenomenon attracting growing interest in higher education, it is not a well-defined notion. Various definitions have been offered. According to Drummond et al. (1998), transferable skills are skills that can be transferred to contexts outside the academic field of study. Bennett et al. (1999) define transferable skills as those “skills which can support study in any discipline, which can be potentially transferred to a range of contexts in higher education or the workplace” (p. 76), while Peter Kearns (2001) defines transferable skills as those skills “essential for employability, which are relevant at different levels for most” (p. 1). As illustrated in these definitions, the concept lacks a clear definition and is open to interpretative flexibility in relation to what transferable skills are (content) and to where skills may be transferred (context).

While transferable skills is a rather ambiguously defined notion, it is commonly used as an overarching umbrella term encompassing diverse non-technical skills such as teamwork, critical thinking, problem solving, leadership, and so forth (e.g., Chan et al., 2017; Chan & Fong, 2018).

The notion of transferable skill is but one of several related regularly used synonyms (Chan et al., 2017; Chan & Fong, 2018), for example soft skills (Succi, & Canovi, 2019), generic skills (Frenk et al., 2010), and personal skills (Elliott & Epstein, 2005), to name just a few (Chan et al., 2017). While some have used these terms interchangeably, others have considered them as reflecting different assumptions (Jones, 2013). Furthermore, these
different terms are referred to as both attributes, competencies, and abilities without further consideration (Chan et al., 2017). For the sake of clarity throughout the remainder of this paper, we will adopt the notion ‘transferable skills’ as an overarching notion covering the abovementioned terms.

Despite the blurred definition of transferable skills, there appears to be some consensus that transferable skills concern the application of skills across contexts, which implies an assumption of transferability of skills (Nägele & Stalder, 2017; Chan & Fong, 2018). According to Barnett & Ceci (2002: 321), “transfer can be thought of as breaking down into two overall factors: the content—that is, what is transferred, and the context—that is, when and where it is transferred from and to“. Content can be categorized on a continuum between specific content (such as facts, routinized procedures) and general content (such as general concepts, problem-solving strategies). Context concerns how far apart the learning context is from the application context (i.e. near transfer vs. far transfer). However, none of the definitions of transferable skills precisely define the degree to which content is specific or general and the context is near or far.

Research on how transferable skills and related terms are used in higher education is hampered by terminological confusion which limits the external generalizability of most empirical results in the field (Cook et al., 2007). It therefore seems urgent to scrutinize the conceptual boundaries of transferable skills in greater depth to reduce this conceptual confusion. This would provide a way forward for students and educators in higher education aiding their learning and teaching of transferable skills, and it would help researchers conduct systematic evaluations and empirical investigations of transferable skills.

**Purpose of the Present Study**
The purpose of this mixed studies literature review was to explore the core characteristics of transferable skills in higher education literature. Thus, our study has two research questions. Firstly, we will create a typology of how the notion of transferable skills is conceptualized in order to identify the range of constituent elements of transferable skills proposed in the included studies. Secondly, we will use this typology to categorize the included quantitative studies investigating the effect of educational interventions. In this study, we will focus on health sciences education in higher education, because transferable skills are important for the future healthcare workforce to be able to adapt to ever changing circumstances of practice, such as the unpredictable health impacts of globalization (Moazzami et al., 2020), changing access to information and communication in communities (Schiavo, 2016), changing population demographics (Frenk et al., 2010; Crisp & Chen, 2014), or changing stakeholder expectations (Tobin-Tyler & Teitelbaum, 2016), just to mention a few examples. Ever changing circumstances of practice and the derived need for learning transferrable skills is relevant for professions in health science broadly speaking, and most likely also for many technical and vocational professions outside health science (e.g. law, business, engineering). We therefore pose the following questions:

1. How are transferable skills conceptualized in the health sciences education research literature?

2. What kind of quantitative evidence underpins the development of transferable skills in health sciences education?

METHOD

Design
In this study, we used the mixed studies literature review design. We applied the seven-stage procedure to conduct a sequential exploratory synthesis (Pluye and Hong, 2014) of the included quantitative, qualitative, and mixed-methods studies

1) Writing a review research question;
2) Defining eligibility criteria;
3) Applying an extensive search strategy in multiple information sources;
4) Identifying potentially relevant studies;
5) Selecting studies based on full text and extracting data;
6) Synthesizing included studies using sequential exploratory synthesis;
   a. Qualitative synthesis
   b. Quantitative synthesis
7) Appraising the quality of included studies.

According to Pluye and Hong (2014), this type of literature review is becoming popular as it provides a rich understanding of complex phenomena. Based on the two research questions above, we conducted the stages 2-7 in the following way:

**Stage 2: Eligibility Criteria**

The following inclusion criteria were deployed: (a) written in English; (b) published in a peer-reviewed journal; (c) explicit use of one of the chosen search terms (transferable, generic, 21st century, future, employability, key, personal, soft, and graduate) combined with different combinations of (skill*, competence*, attribute*, and capabilities) in abstract or title; (d) examining undergraduate or pre-graduate educations in health sciences (more specifically: medicine, dental, pharmacy, nurses, public health, chiropractors, psychology, physical therapy, physiotherapy, sports science, sports and exercise science, sports medicine, exercise physiology, and occupational therapy).
Stage 3: Search Strategy

The search was commenced using the core databases in health sciences education: Scopus, Embase, Web of Science, ProQuest, and Ebsco. The database search was performed on 4 July 2018.

Stage 4: Identifying Potentially Relevant Studies

After removal of duplicates, 20% of the studies was randomly selected for investigator triangulation (Patton, 2002). Subsequently, the entire data set was screened for eligibility by the lead investigator.

Stage 5: Selecting Relevant Studies Based on Full Text and Data Extraction

Data extraction included author details, year and country of publication, type of education, research method, and outcome measures used in each study. In addition, we extracted all text segments (from few lines to half pages) of studies mentioning transferable skills. All extracted data were uploaded in a data-extraction sheet. Then the text extracts were checked by the lead investigator to challenge the validity of the initial extraction.

Stage 6: Synthesizing Included Studies Using Sequential Exploratory Synthesis

Stage 6a (Phase One). We applied the reflexive thematic analysis and followed the six-step approach of Braun & Clarke (2006; 2019) to identify overarching themes of how an ill-defined concept such as transferable skills is conceptualized. Thematic analysis has previously been employed in literature reviews examining other ill-defined concepts such as resilience (Bryan et al., 2017; Patel et al., 2017; Barasa et al., 2018), creativity (Kampylis & Valtanen, 2010), and technology-enhanced learning (Kirkwood & Price, 2014). Thematic analysis involves identifying the intersections of the conceptualization of transferable skills from the included papers and subsequently determining the broader meaning patterns. Consequently, we went beyond a descriptive account, expanding and extending data by
going back and forth from data items to themes. The aim was to develop overarching
themes capturing key aspects of transferable skills. Themes were therefore defined as
concepts, which were repeated across the data set.

**Stage 6b (phase two).** The themes developed in phase one were used as data
containers to categorize the included quantitative studies in phase two, which investigated
the effect of educational interventions on the development of transferable skills. Studies
were included if they used a quantitative experimental or observational design and had
objective outcome measures since we were interested in exploring factors that might have
an impact on the development of transferable skills among students in health sciences
education.

**Stage 7: Appraising the Quality of Included Studies**

The methodologic quality of the included studies was assessed against the EPHPP
tool (Effective Public Health Practice Project, 1998a, 1998b) Quality Assessment Tool for
Quantitative Studies. This appraisal tool has been considered fit for use in literature reviews
to assess methodological quality because 1) it is a generic tool suitable for evaluating a
variety of intervention study designs (Armijo-Olivo et al., 2012); 2) it uses a scoring system
with objective guidelines, which improves the consistency of raters’ scoring of study quality
(Deeks et al., 2003). In addition, the tool has previously been applied in reviews examining
the quality of educational interventions (e.g., Bassir et al., 2013; Heckemann et al., 2015;
Härkänen et al., 2016).

The appraisal tool (EPHPP) comprises a global quality score based on predetermined
criteria indicating the explicit information saturation of a study for the following
components: (A) selection bias, (B) study design, (C) confounders, (D) blinding, (E) data
collection method, and (F) withdrawals / dropouts (Effective Public Health Practice Project,
1998a, 1998b). Consistent with the criteria in the companion document and rating all five parts, we classified the studies as (1) strong (1 = no weak ratings), (2) moderate (2 = one weak rating), or (3) weak (3 = two or more weak ratings).

RESULTS

A total of 152 studies fulfilled the inclusion criteria and formed the basis of our synthesis (Fig. 1). All included studies are listed in the Appendix.

Please insert Figure 1 here

The distribution of transferable skills and related terms used in the 152 included studies by publication year is seen in Figure 2. Figure 2 also shows that the use of transferable skills and related terms in health sciences literature has been increasing since 2001.

Please insert Figure 2 here

The majority of the included studies investigate students from medicine (n = 79, 52%), nursing (n = 24, 16%), and psychology (n = 17, 11%). Others investigate students from pharmacy (n = 7, 5%), inter-disciplines (n = 10, 7%), and physiotherapy (n = 6, 4%). Students from sports science, public health, and occupational therapy represent 1% each. This result indicates that the emerging themes in the following results section is mostly representative of healthcare and health professionals’ education, especially medicine and nursing.

Emerging Themes

Examination of the range of conceptualizations within the included studies testifies to the absence of a widely accepted definition of transferable skills. Therefore, we could identify no single global theme capturing how transferable skills are conceptualized. The
thematic analysis revealed that the notion of transferable skills is conceptualized in three
distinct ways (Table 1).

The synthesis revealed that the meaning of transferable skills could be categorized
into three overarching themes: (1) Program Requirements, (2) Employability, and (3) Holistic
Development. These themes all concern the contexts of application of transferable skills.
Hence, transferable skills were conceptualized as having an inherent directedness of
application, and the three themes identified revealed the contexts in which transferable
skills were assumed to be applied. This thematic typology helped us distinguish between
fundamental differences in contextual conceptualizations of transferable skills. The three
themes were occasionally present simultaneously in the same study (Table 1) even though
they connote different properties. Thus, some studies used the notion of transferable skills
very broadly.

Please insert Table 1 here

Despite differences in the terms assigned to transferable skills (e.g., generic, soft,
transferable, personal, key), the terms were used synonymously across the themes. Thus,
the terms themselves did not reflect differing sets of conceptual assumptions. This finding
was quite surprising given that the semantic differences between the terms could suggest
term-specific content or meaning.

A comparison of the themes in relation to the embedded specific skills shows that
the skills generally do not differ across themes. Thus, the embedded specific skills (such as
information literacy, problem-solving, written and verbal communication) occurred equally
across each of the three identified themes. For example, a specific skill (such as problem
solving) could be conceptualized as being transferable both to an Employability context
(Theme 2) and to a Holistic Development context (Theme 3) simultaneously. This finding
supports the suggested context-based typology where conceptualization of transferable
skills has an inherent directedness of application and not a specific type of skill as its core
meaning.

Interestingly, comparison of the themes revealed that the traditional classroom was
not necessarily regarded as the learning context in which transferable skills were developed.
Thus, some of the studies forming the two subthemes of Employability and the theme of
Holistic Development describe how work placement (e.g., reference number in Table 1: 89,
108, 125) or clinical simulation training (e.g., reference number in Table 1: 67, 114) was the
learning context in which transferable skills would be acquired.

Having conceptualized what is meant by transferable skills in the literature, we use
these themes as ‘data containers’ to categorize quantitative effect studies in the next phase
of this mixed studies review. The aim is to discuss the quantitative empirical evidence
underpinning the identified themes.

Quantitative Effect Studies

Eight of the 152 included studies were quantitative effect studies using objective
outcome measures (see Table 2). They all conceptualized transferable skills as being related
to employability, either ‘future professional work’ or ‘future work’. However, only one study
actually investigated transfer of skills from an educational context to an employment
context (Mohamed et al., 2017). Six studies investigated the development of transferable
skills among students of medicine; five studies used observational cohort designs rather
than experimental designs (see Table 2). The size of the study populations varied from 51 to
383 participants. The type of skills explored varied greatly (e.g., from interpersonal
competency, communication skills, collaborative problem solving, to self-assessment skills,
etc.), and there were no indications that the research converged on any single skill.
Please insert Table 2 here.

Table 3 shows the critical appraisal scores, which were given according to the EPHPP tool. All studies received a weak global quality score based on the information available. Weaker ratings were frequently due to methodological or reporting issues related to blinding. In contrast, study designs and withdrawal/drop-out were, relatively speaking, stronger features of the studies appraised (see Table 3).

Please insert Table 3 here.

DISCUSSION

The aim of this mixed studies review was to examine how transferable skills are conceptualized and subsequently to investigate which educational interventions could promote the development of transferable skills according to current literature in health sciences education. Firstly, we found that transferable skills are conceptualized as having an inherent directedness of application in relation to (1) Program Requirements, (2) Employability, and (3) Holistic Development. Secondly, we found that the empirical evidence appraised was too weak and heterogeneous to underpin any particular educational intervention promoting the development of transferable skills.

How Are Transferable Skills Conceptualized?

Comparing existing definitions and conceptual models is an important first step in clarifying the substantive features of transferable skills. In this regard, each of the three themes identified can separately be matched with conceptualizations described in earlier studies, but no coherent typology of these conceptualizations has yet been offered.

In accordance with our findings of the two subthemes ‘entrance requirements’ and ‘early academic success’, which are embedded within the theme of Program Requirements, Barrie (2006) describes precursor skills (skills that are the basics or even a prerequisite for
university entry) and *complement skills* (skills that help round out students’ disciplinary learning). The former corresponds to the subtheme of ‘entrance requirements’ and the latter to ‘early academic success’. However, the subtheme of ‘course outcome’ is not found in Barrie’s framework. In contrast, Barrie describes two types of transferable skills that we did not detect in our analysis. These are *translation skills* (skills essential in applying disciplinary knowledge in non-disciplinary settings) and *enabling skills* (skills that facilitate scholarly abilities of transposing university experiences into original creations of thoughts and, ideally, contribution to society). Translation skills and enabling skills seem to correspond to David Bridges’ (1993) definition of *transferring skills*: “These are as it were the meta-skills, the second order skills which enable one to select, adapt, adjust and apply one’s other skills to different situations, across different social contexts” (Bridges, 1993: 50).

In contrast, Bridges (1993) defines transferable skills as skills that can be deployed with little or no adaptation in a variety of social settings (Bridges, 1993: 50). The social settings identified in our review were either higher education contexts (theme 1), employment contexts (theme 2), or life in general (theme 3).

Consistent with previous frameworks (e.g., Suleman, 2018; Barbosa, 2017), this review confirms that transferable skills are associated with development of skills for employment, either general skills required for various jobs or skills required for specific jobs. Our theme of *Employability* therefore matches previously described frameworks of transferable skills. In addition, the distinction between discipline-specific skills and generic transferable skills in terms of employability also emerges in some of the leading conceptual frameworks of employability as a concept in higher education research (Römgens *et al.*, 2019).
Consistent with previous studies, this review confirms that the concept of transferable skills is associated with holistic development in relation to whole-person development (Chan et al., 2017). Thus, this context of application has previously been proposed in relation to the concept of transferable skills (Chan & Fong, 2018).

The Three Themes in a Transfer Theoretical Perspective

Comparison of the present findings with those of other studies confirms that transferable skills are conceptualized as having an inherent directedness of application to novel and different contexts (Nägele & Stalder, 2017; Barbosa et al., 2017). A possible explanation for this may be that the notion of transferable skills is used in the literature as a way of emphasizing the assumed transferability of the embedded specific skills. The three themes we identified demonstrate the various contexts in which it is anticipated that transferable skills are applied. Surprisingly, the learning context was not necessarily regarded as higher education, as noted in the result section.

In the introduction section, we outlined the view on context (near transfer vs. far transfer) articulated by Barnett & Ceci (2002) according to which near transfer refers to the close similarity between the context in which knowledge and skills are acquired and in which they are used. Far transfer, on the other hand, is characterized by the use of knowledge or skills across contexts with few identical elements (Barnett and Ceci, 2002). In this transfer theoretical perspective (near transfer vs. far transfer), our themes appear to be multidimensional as the studies from which the themes derive vary in their view on what constitutes the learning context and the application contexts.

The subthemes in the theme Program Requirements (theme 1) cannot easily be categorized on the continuum of transfer distance (i.e. near vs. far transfer). The subtheme ‘early academic success’ contains studies describing the learning context of transferable
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skills, like the university itself (i.e. near transfer), or prior skills developed before entering higher education, which then are expected to be transferred and refined in higher education (i.e. far transfer). The studies forming the subtheme of ‘entrance requirement’ contextualize a non-university context as the context in which transferable skills are developed.

Moreover, selection of applicants implies selection of applicants’ prior skills, which are assumed to be transferred into the program (i.e. far transfer). The studies constituting the subtheme ‘course outcome’ articulate no specific contexts of application wherefore the continuum is unsuitable for this subtheme.

The majority of the studies forming Employability (theme 2) and Holistic Development (theme 3) implicitly or explicitly assume far transfer because higher education is described as the learning context, and the labor market or life in general is described as the application context. These two different contexts were quite dissimilar and remote to one another as they shared only few identical elements. In contrast, the remaining studies encompassing these themes (Employability and Holistic Development) implicitly or explicitly assumed nearer transfer. Thus, simulated settings, work placements, or internships were described as the learning contexts in which transferable skills were acquired. By using learning contexts sharing similarities with the context of application, the distance of transfer is reduced (Blume, Ford, Baldwin & Huang, 2010). The closer the link between the learning context and the application context, the better are the prospects of stimulating transfer, since it is easier to transfer knowledge and skills between contexts that share similarities (Grossman & Salas, 2011). Consequently, the acquisition of transferable skills could be enhanced if the skills are developed in the contexts anticipating their application.

What Underpins the Development of Transferable Skills?
Our review echoes previous reviews, substantiating that the educational interventions performed with the EPHPP tool have modest generalizability beyond the settings in which they were conducted. For example, Härkänen et al. (2016) conducted a systematic review and meta-analysis of educational interventions designed to improve medication administration skills and safety for registered nurses. Thus, among 14 studies reviewed, one study was rated as being of strong quality, four studies as being of moderate quality, and nine studies as being of weak quality. Similarly, conducting a narrative review of nine studies of the effect of aggression training programs for nursing staff and students working in an acute hospital setting, Heckemann et al. (2015) rated one study as being of strong quality, six studies as being of moderate quality, and two studies as being of weak quality. In other words, according to the EPHPP criteria, studies of educational interventions fall short of achieving high quality, as also concluded in other reviews (e.g., Hersch et al., 2014; Price et al., 2015). Several explanations why studies on educational interventions obtain a lower global quality score may be on the table. In our case, blinding seemed to be a particular issue as only one study reported on blinding of outcome assessors (Bargouti et al., 2013) and none on blinding of study participants. This lack of blinding meant that the majority of studies could not achieve a higher global rating score than ‘moderate’ because of the EPHPP scoring system. It is, however, important to bear in mind that although blinding is an important methodological feature (Karanicolas et al., 2010), blinding of outcome assessors and study participants often cannot be done for practical or ethical reasons in authentic and naturalistic educational settings. If outcome assessors actively provide or somehow contribute to the educational intervention (Roberts et al., 2005), blinding is jeopardized. Blinding of study participants so that they are prevented from knowing the aim of the educational intervention might also be difficult in some contexts,
because students might deduce or obtain information about whether they received the educational intervention or not. In addition, ethical considerations were found to obstruct blinding in one instance where researchers collected a written consent in advance of the study to ensure good ethical standards and thereby revealed the research questions (Roberts et al., 2005).

All eight studies conceptualized transferable skills as concerning Employability. However, only one study investigated transfer of skills from an educational context to an employment context (Mohamed et al., 2017). Thus, in the majority of studies, the outcome measures appeared misaligned with the conceptual objective of examining transfer of skills to a work context. The studies mainly investigated students’ performance within higher education and not the extent to which they actually transferred acquired skills to an employment context (Kaufman & Keller, 1994; Praslova, 2010). For educational strategies aimed at developing students’ employability skills to be effective, they must be research based and focused on the transfer of skills acquired in educational contexts to job settings (Bewley & O’Neil, 2013).

Limitation of the Present Study

This review has certain limitations. The fact that a single researcher conducted most of the study selection and data extraction independently is a limitation that might challenge the strength of the review. However, we took this limitation into account in several ways. Firstly, we established a clearly defined set of inclusion criteria through investigator triangulation (Patton, 2002), which minimized subjectivity in study selection. Secondly, we randomly selected a sample of 20% of studies for investigator triangulation (Patton, 2002). Thirdly, it is not required that more researchers locate every available study in a thematic analysis because the results of a conceptualization are not based on the exact number of
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studies describing the same concept (Thomas & Harden, 2008). This point provides some reassurance that excluded studies would not fundamentally alter the nature of the themes identified (Partel et al., 2017). Thus, we conceptualized themes as broad concepts that were repeated across the data set.

Finally, analyzing and presenting the results of the thematic analysis were challenging tasks. We applied the reflexive thematic analysis described by Braun & Clark (2006; 2019) in the analysis and conceptualization of the themes. Hence, the themes are quite abstract compared to the explicit content in the studies (Braun & Clark, 2019). The reliability of the reflexive thematic analysis might therefore be contested since the development of themes depends on the reviewer’s judgment and insight (Thomas & Harden, 2008). We tackled this challenge by developing themes in an iterative process between two researchers and by securing transparency via displaying what led to the developed themes. Consequently, the readers have the opportunity to judge for themselves whether our themes capture the key components of transferable skills as a concept in the health science literature.

**CONCLUSION AND PERSPECTIVES**

This review, the first of its kind, aimed to examine conceptualizations of transferable skills and interventions that may underpin their development in health science education. Within health sciences education, the literature on transferable skills were concentrated in healthcare and health professionals’ education, especially medicine and nursing. While the conceptualizations of transferable skills differ considerably in the broader literature, the results show that in health science education transferable skills reflected three main conceptualizations: Program Requirements, Employability, and Holistic Development.
Consequently, this review has implications for health sciences education because transferable skills are important for the future healthcare workforce to be able to adapt to ever changing circumstances of practice. In this regard, our findings provide an understanding of transferable skills contributing to creating a basis for curriculum development and empirical research on how to develop and assess transferable skills in future healthcare workers. According to Green et al., (2009), conceptual clarity is important for the teaching of transferable skills because well-defined learning objectives provide 1) educators with a clear purpose to focus their teaching efforts; 2) direct educators’ choice of relevant teaching strategies; and 3) guide educators’ assessment strategies. The three identified themes therefore provide a conceptual foundation for aligning teaching and assessment strategies with intended learning objectives in transferable skills curricula.

The review has also implications for future research. We found that the global methodological quality of the empirical studies in this review was sparse and weak. Current literature therefore does not support specific educational interventions for transferable skills development among undergraduate students. Future empirical effect studies on transferrable skills of a higher methodological quality are therefore needed. However, sufficient conceptual precision is of paramount importance regardless of methodological quality because its absence severely threatens the validity of empirical research. In addition, lack of conceptual precision has practical implications for teaching, learning, and assessment in higher education. Hence, it is important to be aware of the transfer theoretical perspective, that is the relation between the learning context and the application context (near transfer vs. far transfer), when using the notion of transferable skills and other related terms in empirical studies. The three themes identified in our study are the first step in clarifying what the concept of transferable skills actually implies in current research in
health science education. Conceptual clarity is crucial for the validity of future empirical studies investigating students’ development of transferable skills, not just in health sciences education but also in higher education generally. We therefore invite future research to draw on our conceptualization of transferable skills as a point of departure for 1) investigations of how and when the concept is applied, and for 2) empirical research on how to develop and assess transferable skills in order to afford students the opportunity to adapt to future change – in higher education and in the labor marked – in a flexible and competent way.

Declarations of interest: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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WHAT DO WE MEAN BY ‘TRANSFERABLE SKILLS’? A LITERATURE REVIEW OF HOW THE CONCEPT IS CONCEPTUALIZED IN UNDERGRADUATE HEALTH SCIENCES EDUCATION

ABSTRACT

Purpose: Due to rapid changes in the future labor market, transferable skills are recognized as a vital learning outcome for students in undergraduate higher education. However, ambiguities surrounding the concept and content of transferable skills hampers the actual teaching and learning of transferable skills. Consequently, there is a great need for an overview of the literature on transferable skills to qualify and develop our approaches to transferrable skills in higher education. This study aims to outline a typology of how transferable skills are conceptualized in health sciences education, that is medicine, nursing and related health professionals education.

Design: The study was a mixed studies literature review, which included quantitative, qualitative, and mixed-methods studies. A seven-stage sequential exploratory synthesis of the included studies was conducted.

Findings: This review showed that transferable skills reflected three main conceptualizations: Program Requirements, Employability, and Holistic Development. Overall, the global methodological quality of the empirical studies of interventions to further transferable skills development in health science education was weak.

Practical implications: By distinguishing between three main conceptualizations of transferable skills, this study’s typology supports alignment in transferable skills curricula because conceptually sound learning objectives provide teachers and students in health sciences educations with a clear purpose, and direct educators’ choice of relevant teaching and assessment strategies.
Research implications: Last, but not least, this study aids clear conceptualization in future empirical studies.

Originality: This review – the first of its kind – contributes to conceptualization of transferable skills as the basis for curriculum development and research.

Keywords: health science education; higher education; literature review; transfer; generic skills; employability.

INTRODUCTION

Due to rapid changes in the future labor market, transferable skills are widely recognized as a vital learning outcome for students in higher education (European Union, 2011; European Union, 2016; OECD, 2016; Universities UK, 2018; Succi, & Canovi, 2019). Transferable skills are assumed an essential prerequisite for developing graduates’ adaptability, flexibility, and employability, affording them the opportunity to rapidly adapt to future change (Jones et al., 2010; EU, 2016; Succi, & Canovi, 2019). However, the conceptual vagueness and ambiguity concerning both the concept and the content of transferable skills hamper the actual teaching and learning of transferable skills (Kember et al., 2007; Green et al., 2009; Jääskelä et al., 2018). The lack of conceptual alignment and the lack of content specificity also threaten evaluation and empirical investigation of transferable skills (Strijbos et al., 2015; Chan et al., 2017). Consequently, there is a great need for a overview of the literature on transferable skills to support students’ development of such skills. This mixed studies literature review (Pluye and Hong, 2014) outlines a typology of how transferable skills are conceptualized and empirically investigated in the field of health sciences education (HSE), that is the bachelors and/or
masters level of educational programs within healthcare, health profession and health sciences such as medicine, nursing, occupational therapy, physiotherapy, nutrition and related disciplines such as sports science and public health.

**Transferable Skills – An Overview**

Although the concept of transferable skills is a phenomenon attracting growing interest in higher education, it is not a well-defined notion. Various definitions have been offered. According to Drummond *et al.* (1998), transferable skills are skills that can be transferred to contexts outside the academic field of study. Bennett *et al.* (1999) define transferable skills as those “skills which can support study in any discipline, which can be potentially transferred to a range of contexts in higher education or the workplace” (p. 76), while Peter Kearns (2001) defines transferable skills as those skills “essential for employability, which are relevant at different levels for most” (p. 1). As illustrated in these definitions, the concept lacks a clear definition and is open to interpretative flexibility in relation to what transferable skills are (content) and to where skills may be transferred (context).

While transferable skills is a rather ambiguously defined notion, it is commonly used as an overarching umbrella term encompassing diverse non-technical skills such as teamwork, critical thinking, problem solving, leadership, and so forth (e.g., Chan *et al.*, 2017; Chan & Fong, 2018).

The notion of transferable skill is but one of several related regularly used synonyms (Chan *et al.*, 2017; Chan & Fong, 2018), for example soft skills (Succi, & Canovi, 2019), generic skills (Frenk *et al.*, 2010), and personal skills (Elliott & Epstein, 2005), to name just a few (Chan *et al.*, 2017). While some have used these terms interchangeably, others have considered them as reflecting different assumptions (Jones, 2013). Furthermore, these
different terms are referred to as both attributes, competencies, and abilities without further consideration (Chan et al., 2017). For the sake of clarity throughout the remainder of this paper, we will adopt the notion ‘transferable skills’ as an overarching notion covering the abovementioned terms.

Despite the blurred definition of transferable skills, there appears to be some consensus that transferable skills concern the application of skills across contexts, which implies an assumption of transferability of skills (Nägele & Stalder, 2017; Chan & Fong, 2018). According to Barnett & Ceci (2002: 321), “transfer can be thought of as breaking down into two overall factors: the content—that is, what is transferred, and the context—that is, when and where it is transferred from and to”. Content can be categorized on a continuum between specific content (such as facts, routinized procedures) and general content (such as general concepts, problem-solving strategies). Context concerns how far apart the learning context is from the application context (i.e. near transfer vs. far transfer). However, none of the definitions of transferable skills precisely define the degree to which content is specific or general and the context is near or far.

Research on how transferable skills and related terms are used in higher education is hampered by terminological confusion which limits the external generalizability of most empirical results in the field (Cook et al., 2007). It therefore seems urgent to scrutinize the conceptual boundaries of transferable skills in greater depth to reduce this conceptual confusion. This would provide a way forward for students and educators in higher education aiding their learning and teaching of transferable skills, and it would help researchers conduct systematic evaluations and empirical investigations of transferable skills.

**Purpose of the Present Study**
The purpose of this mixed studies literature review was to explore the core characteristics of transferable skills in higher education literature. Thus, our study has two research questions. Firstly, we will create a typology of how the notion of transferable skills is conceptualized in order to identify the range of constituent elements of transferable skills proposed in the included studies. Secondly, we will use this typology to categorize the included quantitative studies investigating the effect of educational interventions. In this study, we will focus on health sciences education in higher education, because transferable skills are important for the future healthcare workforce to be able to adapt to ever changing circumstances of practice, such as the unpredictable health impacts of globalization (Moazzami et al., 2020), changing access to information and communication in communities (Schiavo, 2016), changing population demographics (Frenk et al., 2010; Crisp & Chen, 2014), or changing stakeholder expectations (Tobin-Tyler & Teitelbaum, 2016), just to mention a few examples. Ever changing circumstances of practice and the derived need for learning transferrable skills is relevant for professions in health science broadly speaking, and most likely also for many technical and vocational professions outside health science (e.g. law, business, engineering). We therefore pose the following questions:

1. How are transferable skills conceptualized in the health sciences education research literature?

2. What kind of quantitative evidence underpins the development of transferable skills in health sciences education?

METHOD

Design
In this study, we used the mixed studies literature review design. We applied the seven-stage procedure to conduct a sequential exploratory synthesis (Pluye and Hong, 2014) of the included quantitative, qualitative, and mixed-methods studies.

1) Writing a review research question;
2) Defining eligibility criteria;
3) Applying an extensive search strategy in multiple information sources;
4) Identifying potentially relevant studies;
5) Selecting studies based on full text and extracting data;
6) Synthesizing included studies using sequential exploratory synthesis;
   a. Qualitative synthesis
   b. Quantitative synthesis
7) Appraising the quality of included studies.

According to Pluye and Hong (2014), this type of literature review is becoming popular as it provides a rich understanding of complex phenomena. Based on the two research questions above, we conducted the stages 2-7 in the following way:

**Stage 2: Eligibility Criteria**

The following inclusion criteria were deployed: (a) written in English; (b) published in a peer-reviewed journal; (c) explicit use of one of the chosen search terms (transferable, generic, 21st century, future, employability, key, personal, soft, and graduate) combined with different combinations of (skill*, competence*, attribute*, and capabilities) in abstract or title; (d) examining undergraduate or pre-graduate educations in health sciences (more specifically: medicine, dental, pharmacy, nurses, public health, chiropractors, psychology, physical therapy, physiotherapy, sports science, sports and exercise science, sports medicine, exercise physiology, and occupational therapy).
Stage 3: Search Strategy

The search was commenced using the core databases in health sciences education: Scopus, Embase, Web of Science, ProQuest, and Ebsco. The database search was performed on 4 July 2018.

Stage 4: Identifying Potentially Relevant Studies

After removal of duplicates, 20% of the studies was randomly selected for investigator triangulation (Patton, 2002). Subsequently, the entire data set was screened for eligibility by the lead investigator.

Stage 5: Selecting Relevant Studies Based on Full Text and Data Extraction

Data extraction included author details, year and country of publication, type of education, research method, and outcome measures used in each study. In addition, we extracted all text segments (from few lines to half pages) of studies mentioning transferable skills. All extracted data were uploaded in a data-extraction sheet. Then the text extracts were checked by the lead investigator to challenge the validity of the initial extraction.

Stage 6: Synthesizing Included Studies Using Sequential Exploratory Synthesis

Stage 6a (Phase One). We applied the reflexive thematic analysis and followed the six-step approach of Braun & Clarke (2006; 2019) to identify overarching themes of how an ill-defined concept such as transferable skills is conceptualized. Thematic analysis has previously been employed in literature reviews examining other ill-defined concepts such as resilience (Bryan et al., 2017; Patel et al., 2017; Barasa et al., 2018), creativity (Kampylis & Valtanen, 2010), and technology-enhanced learning (Kirkwood & Price, 2014). Thematic analysis involves identifying the intersections of the conceptualization of transferable skills from the included papers and subsequently determining the broader meaning patterns. Consequently, we went beyond a descriptive account, expanding and extending data by
going back and forth from data items to themes. The aim was to develop overarching themes capturing key aspects of transferable skills. Themes were therefore defined as concepts, which were repeated across the data set.

**Stage 6b (phase two).** The themes developed in phase one were used as data containers to categorize the included quantitative studies in phase two, which investigated the effect of educational interventions on the development of transferable skills. Studies were included if they used a quantitative experimental or observational design and had objective outcome measures since we were interested in exploring factors that might have an impact on the development of transferable skills among students in health sciences education.

**Stage 7: Appraising the Quality of Included Studies**

The methodologic quality of the included studies was assessed against the EPHPP tool (Effective Public Health Practice Project, 1998a, 1998b) Quality Assessment Tool for Quantitative Studies. This appraisal tool has been considered fit for use in literature reviews to assess methodological quality because 1) it is a generic tool suitable for evaluating a variety of intervention study designs (Armijo-Olivo et al., 2012); 2) it uses a scoring system with objective guidelines, which improves the consistency of raters’ scoring of study quality (Deeks et al., 2003). In addition, the tool has previously been applied in reviews examining the quality of educational interventions (e.g., Bassir et al., 2013; Heckemann et al., 2015; Härkänen et al., 2016).

The appraisal tool (EPHPP) comprises a global quality score based on predetermined criteria indicating the explicit information saturation of a study for the following components: (A) selection bias, (B) study design, (C) confounders, (D) blinding, (E) data collection method, and (F) withdrawals / dropouts (Effective Public Health Practice Project,
1998a, 1998b). Consistent with the criteria in the companion document and rating all five parts, we classified the studies as (1) strong (1 = no weak ratings), (2) moderate (2 = one weak rating), or (3) weak (3 = two or more weak ratings).

RESULTS
A total of 152 studies fulfilled the inclusion criteria and formed the basis of our synthesis (Fig. 1). All included studies are listed in the Appendix.

Please insert Figure 1 here

The distribution of transferable skills and related terms used in the 152 included studies by publication year is seen in Figure 2. Figure 2 also shows that the use of transferable skills and related terms in health sciences literature has been increasing since 2001.

Please insert Figure 2 here

The majority of the included studies investigate students from medicine (n = 79, 52%), nursing (n = 24, 16%), and psychology (n = 17, 11%). Others investigate students from pharmacy (n = 7, 5%), inter-disciplines (n = 10, 7%), and physiotherapy (n = 6, 4%). Students from sports science, public health, and occupational therapy represent 1% each. This result indicates that the emerging themes in the following results section is mostly representative of healthcare and health professionals’ education, especially medicine and nursing.

Emerging Themes
Examination of the range of conceptualizations within the included studies testifies to the absence of a widely accepted definition of transferable skills. Therefore, we could identify no single global theme capturing how transferable skills are conceptualized. The
thematic analysis revealed that the notion of transferable skills is conceptualized in three
distinct ways (Table 1).

The synthesis revealed that the meaning of transferable skills could be categorized
into three overarching themes: (1) Program Requirements, (2) Employability, and (3) Holistic
Development. These themes all concern the contexts of application of transferable skills.
Hence, transferable skills were conceptualized as having an inherent directedness of
application, and the three themes identified revealed the contexts in which transferable
skills were assumed to be applied. This thematic typology helped us distinguish between
fundamental differences in contextual conceptualizations of transferable skills. The three
themes were occasionally present simultaneously in the same study (Table 1) even though
they connote different properties. Thus, some studies used the notion of transferable skills
very broadly.

*Please insert Table 1 here*

Despite differences in the terms assigned to transferable skills (e.g., generic, soft,
transferable, personal, key), the terms were used synonymously across the themes. Thus,
the terms themselves did *not* reflect differing sets of conceptual assumptions. This finding
was quite surprising given that the semantic differences between the terms could suggest
term-specific content or meaning.

A comparison of the themes in relation to the embedded specific skills shows that
the skills generally do not differ across themes. Thus, the embedded specific skills (such as
information literacy, problem-solving, written and verbal communication) occurred equally
across each of the three identified themes. For example, a specific skill (such as problem
solving) could be conceptualized as being transferable both to an Employability context
(theme 2) and to a Holistic Development context (theme 3) simultaneously. This finding
supports the suggested context-based typology where conceptualization of transferable skills has an inherent directedness of application and not a specific type of skill as its core meaning.

Interestingly, comparison of the themes revealed that the traditional classroom was not necessarily regarded as the learning context in which transferable skills were developed. Thus, some of the studies forming the two subthemes of Employability and the theme of Holistic Development describe how work placement (e.g., reference number in Table 1: 89, 108, 125) or clinical simulation training (e.g., reference number in Table 1: 67, 114) was the learning context in which transferable skills would be acquired.

Having conceptualized what is meant by transferable skills in the literature, we use these themes as ‘data containers’ to categorize quantitative effect studies in the next phase of this mixed studies review. The aim is to discuss the quantitative empirical evidence underpinning the identified themes.

**Quantitative Effect Studies**

Eight of the 152 included studies were quantitative effect studies using objective outcome measures (see Table 2). They all conceptualized transferable skills as being related to employability, either ‘future professional work’ or ‘future work’. However, only one study actually investigated transfer of skills from an educational context to an employment context (Mohamed et al., 2017). Six studies investigated the development of transferable skills among students of medicine; five studies used observational cohort designs rather than experimental designs (see Table 2). The size of the study populations varied from 51 to 383 participants. The type of skills explored varied greatly (e.g., from interpersonal competency, communication skills, collaborative problem solving, to self-assessment skills, etc.), and there were no indications that the research converged on any single skill.
Table 3 shows the critical appraisal scores, which were given according to the EPHPP tool. All studies received a weak global quality score based on the information available. Weaker ratings were frequently due to methodological or reporting issues related to blinding. In contrast, study designs and withdrawal/drop-out were, relatively speaking, stronger features of the studies appraised (see Table 3).

DISCUSSION

The aim of this mixed studies review was to examine how transferable skills are conceptualized and subsequently to investigate which educational interventions could promote the development of transferable skills according to current literature in health sciences education. Firstly, we found that transferable skills are conceptualized as having an inherent directedness of application in relation to (1) Program Requirements, (2) Employability, and (3) Holistic Development. Secondly, we found that the empirical evidence appraised was too weak and heterogeneous to underpin any particular educational intervention promoting the development of transferable skills.

How Are Transferable Skills Conceptualized?

Comparing existing definitions and conceptual models is an important first step in clarifying the substantive features of transferable skills. In this regard, each of the three themes identified can separately be matched with conceptualizations described in earlier studies, but no coherent typology of these conceptualizations has yet been offered.

In accordance with our findings of the two subthemes ‘entrance requirements’ and ‘early academic success’, which are embedded within the theme of Program Requirements, Barrie (2006) describes precursor skills (skills that are the basics or even a prerequisite for
university entry) and *complement skills* (skills that help round out students’ disciplinary learning). The former corresponds to the subtheme of ‘entrance requirements’ and the latter to ‘early academic success’. However, the subtheme of ‘course outcome’ is not found in Barrie’s framework. In contrast, Barrie describes two types of transferable skills that we did not detect in our analysis. These are *translation skills* (skills essential in applying disciplinary knowledge in non-disciplinary settings) and *enabling skills* (skills that facilitate scholarly abilities of transposing university experiences into original creations of thoughts and, ideally, contribution to society). Translation skills and enabling skills seem to correspond to David Bridges’ (1993) definition of *transferring skills*: “These are as it were the meta-skills, the second order skills which enable one to select, adapt, adjust and apply one’s other skills to different situations, across different social contexts” (Bridges, 1993: 50).

In contrast, Bridges (1993) defines transferable skills as skills that can be deployed with little or no adaptation in a variety of social settings (Bridges, 1993: 50). The social settings identified in our review were either higher education contexts (theme 1), employment contexts (theme 2), or life in general (theme 3).

Consistent with previous frameworks (e.g., Suleman, 2018; Barbosa, 2017), this review confirms that transferable skills are associated with development of skills for employment, either general skills required for various jobs or skills required for specific jobs. Our theme of *Employability* therefore matches previously described frameworks of transferable skills. In addition, the distinction between discipline-specific skills and generic transferable skills in terms of employability also emerges in some of the leading conceptual frameworks of employability as a concept in higher education research (Römgens *et al.*, 2019).
Consistent with previous studies, this review confirms that the concept of transferable skills is associated with holistic development in relation to whole-person development (Chan et al., 2017). Thus, this context of application has previously been proposed in relation to the concept of transferable skills (Chan & Fong, 2018).

The Three Themes in a Transfer Theoretical Perspective

Comparison of the present findings with those of other studies confirms that transferable skills are conceptualized as having an inherent directedness of application to novel and different contexts (Nägele & Stalder, 2017; Barbosa et al., 2017). A possible explanation for this may be that the notion of transferable skills is used in the literature as a way of emphasizing the assumed transferability of the embedded specific skills. The three themes we identified demonstrate the various contexts in which it is anticipated that transferable skills are applied. Surprisingly, the learning context was not necessarily regarded as higher education, as noted in the result section.

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The majority of the studies forming Employability (theme 2) and Holistic Development (theme 3) implicitly or explicitly assume far transfer because higher education is described as the learning context, and the labor market or life in general is described as the application context. These two different contexts were quite dissimilar and remote to one another as they shared only few identical elements. In contrast, the remaining studies encompassing these themes (Employability and Holistic Development) implicitly or explicitly assumed nearer transfer. Thus, simulated settings, work placements, or internships were described as the learning contexts in which transferable skills were acquired. By using learning contexts sharing similarities with the context of application, the distance of transfer is reduced (Blume, Ford, Baldwin & Huang, 2010). The closer the link between the learning context and the application context, the better are the prospects of stimulating transfer, since it is easier to transfer knowledge and skills between contexts that share similarities (Grossman & Salas, 2011). Consequently, the acquisition of transferable skills could be enhanced if the skills are developed in the contexts anticipating their application.

What Underpins the Development of Transferable Skills?
Our review echoes previous reviews, substantiating that the educational interventions performed with the EPHPP tool have modest generalizability beyond the settings in which they were conducted. For example, Härkänen et al. (2016) conducted a systematic review and meta-analysis of educational interventions designed to improve medication administration skills and safety for registered nurses. Thus, among 14 studies reviewed, one study was rated as being of strong quality, four studies as being of moderate quality, and nine studies as being of weak quality. Similarly, conducting a narrative review of nine studies of the effect of aggression training programs for nursing staff and students working in an acute hospital setting, Heckemann et al. (2015) rated one study as being of strong quality, six studies as being of moderate quality, and two studies as being of weak quality. In other words, according to the EPHPP criteria, studies of educational interventions fall short of achieving high quality, as also concluded in other reviews (e.g., Hersch et al., 2014; Price et al., 2015). Several explanations why studies on educational interventions obtain a lower global quality score may be on the table. In our case, blinding seemed to be a particular issue as only one study reported on blinding of outcome assessors (Bargouti et al., 2013) and none on blinding of study participants. This lack of blinding meant that the majority of studies could not achieve a higher global rating score than ‘moderate’ because of the EPHPP scoring system. It is, however, important to bear in mind that although blinding is an important methodological feature (Karanicolas et al., 2010), blinding of outcome assessors and study participants often cannot be done for practical or ethical reasons in authentic and naturalistic educational settings. If outcome assessors actively provide or somehow contribute to the educational intervention (Roberts et al., 2005), blinding is jeopardized. Blinding of study participants so that they are prevented from knowing the aim of the educational intervention might also be difficult in some contexts,
because students might deduce or obtain information about whether they received the educational intervention or not. In addition, ethical considerations were found to obstruct blinding in one instance where researchers collected a written consent in advance of the study to ensure good ethical standards and thereby revealed the research questions (Roberts et al., 2005).

All eight studies conceptualized transferable skills as concerning Employability. However, only one study investigated transfer of skills from an educational context to an employment context (Mohamed et al., 2017). Thus, in the majority of studies, the outcome measures appeared misaligned with the conceptual objective of examining transfer of skills to a work context. The studies mainly investigated students’ performance within higher education and not the extent to which they actually transferred acquired skills to an employment context (Kaufman & Keller, 1994; Praslova, 2010). For educational strategies aimed at developing students’ employability skills to be effective, they must be research based and focused on the transfer of skills acquired in educational contexts to job settings (Bewley & O’Neil, 2013).

Limitation of the Present Study

This review has certain limitations. The fact that a single researcher conducted most of the study selection and data extraction independently is a limitation that might challenge the strength of the review. However, we took this limitation into account in several ways. Firstly, we established a clearly defined set of inclusion criteria through investigator triangulation (Patton, 2002), which minimized subjectivity in study selection. Secondly, we randomly selected a sample of 20% of studies for investigator triangulation (Patton, 2002). Thirdly, it is not required that more researchers locate every available study in a thematic analysis because the results of a conceptualization are not based on the exact number of
studies describing the same concept (Thomas & Harden, 2008). This point provides some
reassurance that excluded studies would not fundamentally alter the nature of the themes
identified (Partel et al., 2017). Thus, we conceptualized themes as broad concepts that were
repeated across the data set.

Finally, analyzing and presenting the results of the thematic analysis were
challenging tasks. We applied the reflexive thematic analysis described by Braun & Clark
(2006; 2019) in the analysis and conceptualization of the themes. Hence, the themes are
quite abstract compared to the explicit content in the studies (Braun & Clark, 2019). The
reliability of the reflexive thematic analysis might therefore be contested since the
development of themes depends on the reviewer’s judgment and insight (Thomas &
Harden, 2008). We tackled this challenge by developing themes in an iterative process
between two researchers and by securing transparency via displaying what led to the
developed themes. Consequently, the readers have the opportunity to judge for themselves
whether our themes capture the key components of transferable skills as a concept in the
health science literature.

CONCLUSION AND PERSPECTIVES

This review, the first of its kind, aimed to examine conceptualizations of transferable
skills and interventions that may underpin their development in health science education.
Within health sciences education, the literature on transferable skills were concentrated in
healthcare and health professionals’ education, especially medicine and nursing. While the
conceptualizations of transferable skills differ considerably in the broader literature, the
results show that in health science education transferable skills reflected three main
conceptualizations: Program Requirements, Employability, and Holistic Development.
Consequently, this review has implications for health sciences education because transferable skills are important for the future healthcare workforce to be able to adapt to ever changing circumstances of practice. In this regard, our findings provide an understanding of transferable skills contributing to creating a basis for curriculum development and empirical research on how to develop and assess transferable skills in future healthcare workers. According to Green et al., (2009), conceptual clarity is important for the teaching of transferable skills because well-defined learning objectives provide 1) educators with a clear purpose to focus their teaching efforts; 2) direct educators’ choice of relevant teaching strategies; and 3) guide educators’ assessment strategies. The three identified themes therefore provide a conceptual foundation for aligning teaching and assessment strategies with intended learning objectives in transferable skills curricula.

The review has also implications for future research. We found that the global methodological quality of the empirical studies in this review was sparse and weak. Current literature therefore does not support specific educational interventions for transferable skills development among undergraduate students. Future empirical effect studies on transferrable skills of a higher methodological quality are therefore needed. However, sufficient conceptual precision is of paramount importance regardless of methodological quality because its absence severely threatens the validity of empirical research. In addition, lack of conceptual precision has practical implications for teaching, learning, and assessment in higher education. Hence, it is important to be aware of the transfer theoretical perspective, that is the relation between the learning context and the application context (near transfer vs. far transfer), when using the notion of transferable skills and other related terms in empirical studies. The three themes identified in our study are the first step in clarifying what the concept of transferable skills actually implies in current research in
health science education. Conceptual clarity is crucial for the validity of future empirical studies investigating students’ development of transferable skills, not just in health sciences education but also in higher education generally. We therefore invite future research to draw on our conceptualization of transferable skills as a point of departure for 1) investigations of how and when the concept is applied, and for 2) empirical research on how to develop and assess transferable skills in order to afford students the opportunity to adapt to future change – in higher education and in the labor market – in a flexible and competent way.

Declarations of interest: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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Running head: What Do We Mean By ‘Transferable Skills’?

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https://doi.org/10.1191/1478088706qp063oa


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Figure 1
Flowchart of search and selection strategy

Records identified through database searching
(n = 1405)

Records after duplicates removed
(n = 679)

Records screened
(n = 679)

Full-text articles assessed for eligibility
(n = 230)

Studies included in qualitative synthesis
(n = 152)

Full-text articles excluded, with reasons
(n = 78)
- Wrong population (n=37)
- Not English (n=10)
- Not article (n=19)
- Not topic (n=12)

Studies included for thematic analysis
(n = 152)

Studies included for quality appraisal
(n = 8)
**Figure 2**

Search terms by year (n = 152)

The diagram shows the number of studies by year, with specific terms highlighted:
- Generic
- Soft
- Core
- Key
- Employability
- Umbrella terms in combination
- Transferable
- Graduate
- Personal
- Future
- 21st century

The data covers the years from 1987 to 2018.
Table 1
Results of authors’ thematic analysis of themes and subthemes derived from the thematic analysis of included articles* 

<table>
<thead>
<tr>
<th>THEMES</th>
<th>SUBTHEMES</th>
<th>REFERENCE NUMBER ACCORDING TO APPENDIX*</th>
<th>(n)</th>
<th>(N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Requirements</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entrance requirements</td>
<td></td>
<td>1-7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Early academic success</td>
<td></td>
<td>7-20</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Course outcome</td>
<td></td>
<td>3, 12-14, 21-42</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Employability</td>
<td></td>
<td></td>
<td></td>
<td>124</td>
</tr>
<tr>
<td>Future professional work</td>
<td></td>
<td>1, 7, 10, 15, 17, 26, 27, 36, 41-107</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Future work</td>
<td></td>
<td>3, 11, 13, 14, 16, 22, 24, 29, 31-33, 35, 53, 108-144</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Holistic Development</td>
<td></td>
<td>7, 14, 15, 17, 24, 37, 89, 108, 114, 127, 138, 145</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Non-categorizable papers</td>
<td></td>
<td>146-152</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Note. See the appendix for listed references
### Table 2

**Characteristics of included quantitative effect studies (n = 8)**

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Subtheme identified by us</th>
<th>Study aim</th>
<th>Study design</th>
<th>Participants</th>
<th>Outcome examined</th>
<th>Confounders controlled</th>
<th>Analysis</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohamed et al.</td>
<td>Future professional work</td>
<td>To evaluate the impact of formal assessment of soft skills on students’ interpersonal competency.</td>
<td>Observation al. Two group comparison: The intervention cohort was assessed on soft skills; the comparison cohort was not.</td>
<td>340 final-year dentist students. ($n_{\text{intervention}} = 153$, $n_{\text{comparison}} = 187$).</td>
<td>Interpersonal competency assessed by patients in a student clinic with a survey.</td>
<td>Partly: gender, ethnicity and education level.</td>
<td>Chi-squared test and Fisher’s Exact Test.</td>
<td>No cohort differences in interpersonal competency were found.</td>
</tr>
<tr>
<td>Mylopoulos &amp; Woods</td>
<td>Future work</td>
<td>To compare the relative impacts of basic science instruction and clinically focused instruction on performance on Preparation for Future learning Assessment (PFLA).</td>
<td>Experimental. Participants were randomly assigned to basic science instruction or clinically focused instruction.</td>
<td>51 pre-clerkship medical students.</td>
<td>Preparation for future learning was examined with a test (PFLA) which required participants to diagnose 16 patient cases based on novel disease conditions.</td>
<td>All</td>
<td>Independent sample t-test.</td>
<td>Participants in basic science learning group scored significantly higher in the assessment of preparation for future learning (PFLA).</td>
</tr>
<tr>
<td>Barghouti et al.</td>
<td>Future work</td>
<td>To evaluate the effect of a short course in evidence-based medicine (EBM) on students’ development of knowledge and skills in EBM.</td>
<td>Observation al. Cohort study (One group pre + posttest).</td>
<td>54 fifth-year medical students.</td>
<td>Evidence-based medicine was examined with a test (Fresno) which evaluates three steps of EBM (Ask, Acquire, Appraise).</td>
<td>All</td>
<td>Paired t-test.</td>
<td>Participants in the EBM course significantly improve knowledge and skills in EBM.</td>
</tr>
<tr>
<td>Humphris</td>
<td>Future professional work</td>
<td>To determine the influence of knowledge on communicative skills over time.</td>
<td>Observation al. Cohort study (One group pre + posttest).</td>
<td>383 first-year medical students followed for 17 months.</td>
<td>Communication skills were examined by performance in objective structured clinical examinations (OSCE).</td>
<td>None</td>
<td>Exploratory factor analysis and structural equation analysis</td>
<td>Knowledge of communicative skills has a small but significant influence on performance in OSCE.</td>
</tr>
<tr>
<td>Mughal et al.</td>
<td>Future professional work</td>
<td>To evaluate the impact of problem based</td>
<td>Observation al. Analytical cross-</td>
<td>210 first-, second-, and third-year medical</td>
<td>CPS was examined by the ‘Collaborativ</td>
<td>None</td>
<td>T-test and ANOVA</td>
<td>Participants developed social skills to a greater</td>
</tr>
</tbody>
</table>
Pakistan learning (PBL) on collaborative problem solving skills (CPS).

**Problem Solving framework** which consist of two dimensions (I) social skills (II) cognitive skills.

Murdoch-Eaton, 2002 UK

To evaluate the educational contribution of self-assessment during individual students projects.

Observational. Analytical cross-sectional study design.

254 third-year medical students.

Self-evaluation was examined by comparing supervisors’ and students’ assessments of students’ individual projects.

None Wilcoxon-Test No significant differences between students’ self-evaluations and supervisors’ ratings of individual projects.

Prichard et al. 2006

To investigate if team-skills training enhance the performance of collaborative groups through the introduction of a team development program.

Experiment al. Two group comparison: The intervention cohort received team-skills training, the control cohort did not.

295 second-year psychology students. \( n_{\text{intervention}} = 133 \quad n_{\text{control}} = 94 \).

Team-skill training was examined by student group marks and key-skill ratings.

Partly Gender, age and team experience ANCOVA Team-skills training enhance collaborative learning group performance, but these benefits may be lost if training groups are disrupted.

Roberts et al. 2005

To compare the relative impacts of a criteria-based method and a clinical-research-experience-based method on the performance of discerning ethical problems in human clinical research studies.

Experiment al. Participants were randomly assigned to the intervention, comparison, or the control group.

83 first-third- and fourth-year medical students. \( n_{\text{intervention}} = 28 \quad n_{\text{comparison}} = 28 \quad n_{\text{control}} = 27 \).

Ethical evaluation skills were examined by a written posttest of ability to detect ethical problems in hypothetical protocol vignettes.

All MANOVA Participants in the criteria-focused intervention group scored significantly higher in the assessment of enhanced ethical evaluation skills.
### Table 3

#### Quality assessment of the included quantitative effect studies according to the EPHPP tool (n = 8)

<table>
<thead>
<tr>
<th>Author Year</th>
<th>Selection bias</th>
<th>Study design</th>
<th>Cofounders</th>
<th>Blinding</th>
<th>Data collection method</th>
<th>Withdrawals and drop-outs</th>
<th>Global rating for paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mohamed et al. 2017</td>
<td>1</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Mylopaulus &amp; Wood, 2014</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Barghouti et al. 2013</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Humpris 2002</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Mughal et al. 2018</td>
<td>3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Murdoch-Eaton 2002</td>
<td>3</td>
<td></td>
<td>3</td>
<td>3</td>
<td>3</td>
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<td>3</td>
</tr>
<tr>
<td>Prichard et al. 2006</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>3</td>
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<td>3</td>
</tr>
<tr>
<td>Robergs et al. 2005</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

**Note:** Abbreviations: 1 = strong; 2 = moderate; 3 = weak.
Appendix

List of 152 included articles for thematic analysis referring to table 1


