A Scoping Review of the Relation Between Problem-based Learning and Professional Identity Development in Medical Education

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ABSTRACT

There is a substantial amount of research pointing to the benefits of pedagogical approaches such as problem-based learning (PBL) and the importance of developing professional identity as a physician in medical education. The aim of this review is to investigate the existing literature concerned with the relation between PBL and professional identity development in undergraduate medical students. We performed a scoping review of six electronic databases to map out how the relation between PBL and professional identity development in undergraduate medical students is presented in the existing literature. Eight peer-reviewed full text articles were retrieved as eligible for review. The most important conclusion from our work is that even though the topic of professional identity development in medical education has been studied quite extensively, there is a lack of knowledge about how new types of pedagogical approaches such as how a PBL curriculum influences medical students' professional identity development.

INTRODUCTION

Today medical educations around the world have to meet the demands from the fast-changing societies and healthcare systems, and furthermore medical knowledge and the way of treating complex diseases are rapidly expanding (Boyd & Fortin, 2010; Stenberg, Haaland-Øverby, Fredriksen, Westermann & Kvisvik, 2016). To keep pace with such requirements and changes,

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a high-quality education and practice that prepare medical graduates for the work as a physician is essential (Boyd & Fortin, 2011).

Professional identity development is a substantial theme in the research field of medical education, and is also acknowledged as a way of preparing graduate medical students for the work as physicians (Cruess, Cruess, Boudreau, Snell & Steinert, 2014; Passi, Doug, Peile, Thistlethwaite & Johnson, 2010). Similar research indicates that a strong sense of professional identity enhances robustness and preparedness to the transition from medical student to physician (Dolmans, De Grave, Wolfhagen & Van Der Vleuten, 2005; Lohfeld, Neville & Norman, 2005; Sharpless et al.,2015; Tweed, Bagg, Child, Wilkinson & Weller, 2010). Therefore, the importance of developing professional identity has been emphasised by international guidelines in medical education by organisations as Royal College of physicians and surgeons of Canada, Accreditation Council for Graduate Medical Education and Tomorrows Doctor (Franco, Franco, Severo & Ferreira, 2015; Maudsley & Strivens, 2000) and seems to have high priority on the medical educational agenda (Hefler & Ramnanan, 2017; Passi, Doug, Peile, Thistlethwaite & Johnson, 2010; Sharpless et al., 2015). Besides medical expert knowledge, medical students have to learn to think and act appropriately in their professional positions, understanding workplace cultures, meet the expectations of patients, relatives and other professionals, be effective in working with different stakeholders, and discerning in making judgements about ethical issues (Alba & Barnacle, 2007; Cruess, Cruess, Boudreau, Snell & Steinert, 2014; Sharpless et al., 2015). This leads us to the point that the curriculum in medical education has an important and meaningful role to play in supporting students' professional identity development and is to be seen as a vital source in the transformation to becoming a physician.

Parallel to the increasing interest of professional identity development in medical education, research in PBL has been given much attention over the last decade (Barnett, 2009; Savery, 2006; Walke, Leary, Hmelo-Silver, Ertmer & Lafayette, 2015).

Most researchers agree that PBL displays the following four characteristics: (a) a focus on complex, real world problems that has no one right solution, (b) based on group work, (c) students gain new information via self-directed learning and (d) teachers facilitate the learning process (Boud & Feletti, 2013; Hmelo-Silver, 2004; Walke, Leary, Hmelo-Silver, Ertmer & Lafayette, 2015). A PBL curriculum that involves these characteristics facilitates medical students to learn in ways that mirror professional practice and to attain high-level competencies and transferable skills, and therefore assists the demands of preparing the medical graduates for clinical practice (Barrows, 1990; Murray & Savin-Baden, 2000).

The competencies that PBL a curriculum offers the graduate students as collaborative skills, self-reflection, critical thinking, self-directed learning and solving real-life problems is the key to assisting medical students in making a smooth transition to the clinical setting (Barrows &

Tamblyn, 1980; Boud & Feletti, 2013; Tan, Van Der Molen & Schmidt, 2016). In addition to these competencies, PBL also brings the medical students into real-life situations either with real patients or cases that mirrors real life situations as a learning resource and the need for cooperation and communication with other professionals, which enhance confidence, motivation and satisfaction (Bleaklet & Bligh, 2008; Maudsley & Strivens, 2000).

Having noticed that PBL curriculum and professional identity development independently were prevalent in the field of medical education research we set out to explore the scope of existing literature which present the relation between PBL and professional identity development in a medical education context.

To identify and uncover the volume of medical education research about the relation between PBL and professional identity development we decided to conduct a scoping review and thus the research question we seek to answer is as follows:

> How is the relation between problem-based learning and professional identity development represented in the field of medical education research?

Since it is not unreasonable to assume that PBL curricula reinforce a certain professional identity development and mindset, which is unique to the PBL pedagogy, it is important to explore the existing research to gain new knowledge about how PBL a curriculum affects the professional identity development of medical students.

METHOD

This scoping review used the established scoping review framework delineated by Arksey and O'Malley because it enabled researchers to identify and summarize known literature on a given topic regardless of study design (Arksey & O'Malley, 2005; Levac, Colquhoun & O'Brien, 2010). Furthermore, Arksey and O'Malley drew four common reasons why a scoping review might be conducted: (a) to examine the extent, range and nature of research activity, (b) to determine the value of undertaking a full systematic review, (c) to summarize and disseminate research findings, (d) to identify research gaps in the existing literature (Arksey & O'Malley, 2005; Levac, Colquhoun & O'Brien, 2010). All four of these reasons supported our aim for conducting this scoping review as we sought to examine the volume, range and nature of papers that investigates the relation between PBL and professional identity development in medical education.

To guide the search strategy, we used the five key phases that one must go through when conducting a scoping review as outlined by Arksey & O'Malley (2005) and Levac, Colquhoun & O'Brien (2010): First starting point was to identify and formulate the research question to

guide the search strategy. Second, to identify relevant studies, through scoping the literature as comprehensively as possible. Third, to select the relevant studies which, involved inclusion and exclusion criteria based on the research question. Fourth, the charting was used to extract data from each of the included studies and a descriptive analytical method was used to extract contextual or process-oriented information from each study. Finally, collating, summarizing, and reporting the results which demanded consistency and clarity.

We have chosen to follow Arksey & O'Malley's (2005) and Levac, Colquhoun & O'Brien (2010) guidelines for scoping reviews. We consider this approach to be appropriate to the topic of our study in accordance with what has been defined as the overall purpose of conducting scoping reviews; a form of knowledge synthesis that addresses an exploratory research question aimed at mapping key concepts, types of evidence and knowledge gaps in the literature.

Search strategy and selection criteria

Based on our research question, the following keywords were identified to manage the literature search: medical education OR medical student OR medical students AND identity AND problem based learning OR problem-based learning. These keywords in the mentioned order together with relevant synonyms were combined to reflect the specific search string that was used to search relevant databases:

> (("medical education" OR "medical student" OR "Medical students") AND
>
> identity AND ("problem based learning" OR "problem-based learning")).

We systematically searched the following six databases: PubMed, Scopus, ProQuest, PsychINFO, EBSCOhost and Medline. In keeping with the intention of scoping reviews as outlined by Arksey and O'Malley (2005) and Levac, Colquhoun & O'Brien (2010), these databases were selected to give comprehensive coverage and concerned with medical education or higher education, because research in medical education is not necessarily published in medical education journals.

To encircle the specific topic of our scoping review, we employed a number of criteria for inclusion as well as exclusion of studies derived from the research question. Studies were included for further review if:

- Problem based learning/problem-based learning was mentioned in either the title, abstract or keywords
- Identity was mentioned in either the title, abstract or keywords
- The study was conducted in the context of undergraduate medical education
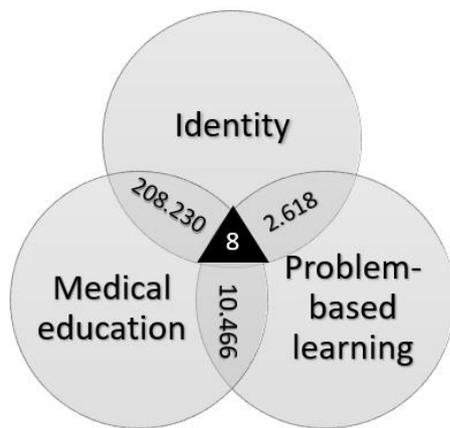
Figure 1. Volume of identified papers in six databases used in the scoping review concerned with PBL, Medical education and professional identity.

In addition to the scoping review, a preliminary search was conducted to strengthen the relevance of our scoping review. As shown in Figure 1, research in identity and medical education is well represented with 208,230 identified papers and 10.466 papers were identified relating to research in PBL and medical education. 2.618 papers were identified relating to PBL and identity and only 8 papers met the inclusion criteria derived from the research question.

In order to limit our search, studies were excluded if they were not available in English. Books, book chapters, conference abstracts and non-reviewed publications were also excluded. Having performed the initial literature search using the specific search string outlined above, we continued to sort the articles by employing the criteria for inclusion and exclusion in the following three steps: First we identified and removed the duplicates from the first search, we used the reference manager Mendeley. Second, the abstracts of the remaining articles were sorted manually, in the sense that titles, abstracts and keywords were manually screened.

In this step, only the articles conducted in a medical education context with a primary focus on undergraduate medical students' and mentioning problem based learning/ problem-based learning and identity in the title, abstract or keywords were included. Third, the full-text version of the remaining articles was retrieved and included for in-depth analysis. To ensure the eligibility of the selection of articles guided by the research question, the inclusion and exclusion process, was assessed jointly by three researchers.

The search and identification process of the literature search is presented in Figure 2.
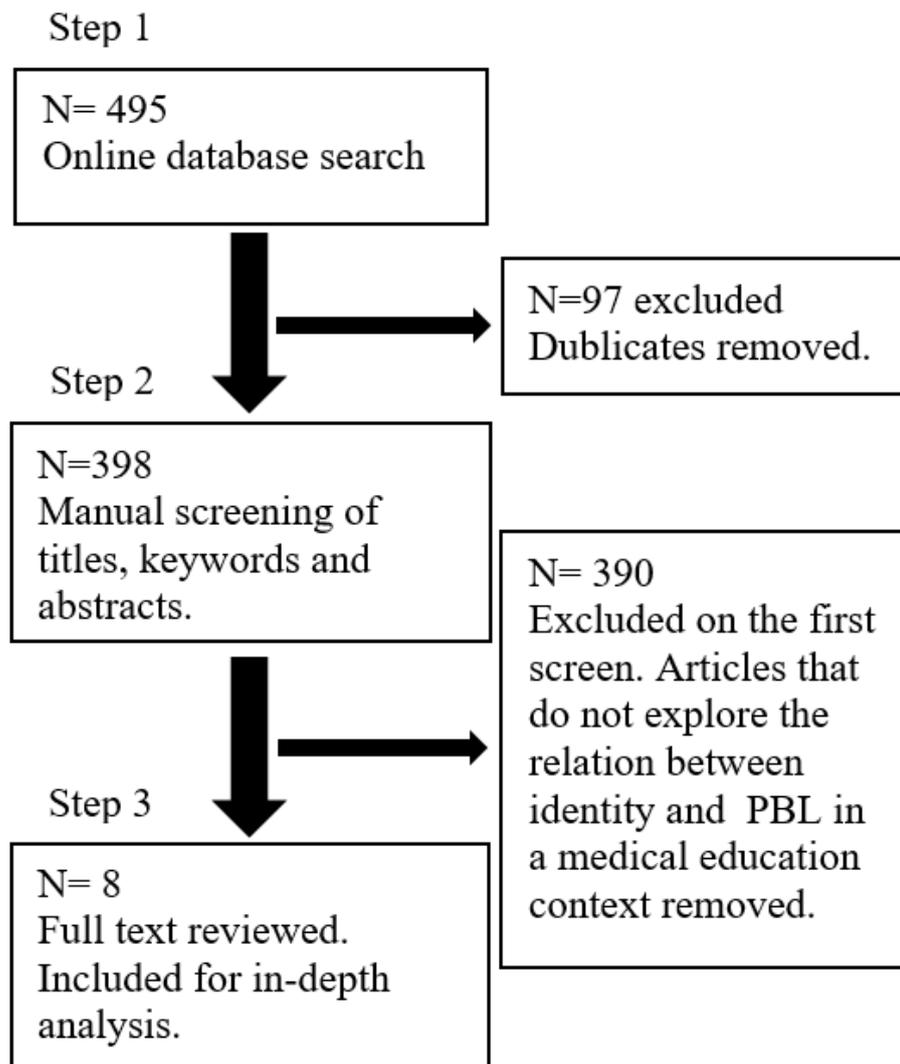
Step 1

N= 495
Online database search

N=97 excluded
Dublicates removed.

Step 2

N=398
Manual screening of titles, keywords and abstracts.

N= 390
Excluded on the first screen. Articles that do not explore the relation between identity and PBL in a medical education context removed.

Step 3

N= 8
Full text reviewed. Included for in-depth analysis.

Figure 2. Search and identification flowchart.

The principal strength of this scoping review was the detailed search strategy designed to cover all the research that studies relations between PBL and undergraduate medical students' professional identity development.

RESULTS

The search was conducted on October 10, 2018 and included six databases PubMed (23), Scopus (35), ProQuest (377), PsychINFO (21), EBSCOhost (17) and Medline (22), which yielded in total 398 articles, which were potentially relevant, when duplicates were removed. After further screening of the 398 titles, keywords and abstracts, in accordance with inclusion and exclusion criteria, 8 full text articles were retrieved for detailed review, as shown in table 1 below. The very limited number of articles for review testifies Fig. 1 to the lack of studies which explicitly examine the relation between professional identity development and PBL.

Ref. nr.	Database	Authors	Year	Title	Journal
[1]	Scopus	Bell, K., Boshuizen, H. P. A., Scherpbier, A., & Dornan, T.	2009	When only the real thing will do: Junior medical students' learning from real patients.	*Medical Education, 43*(11), 1036–1043
[2]	MEDline	Berkhout, J. J., Helmich, E., Teunissen, P. W., van der Vleuten, C. P. M., & Jaarsma, A. D. C.	2018	Context matters when striving to promote active and lifelong learning in medical education.	*Medical Education, 52*(1), 34–44.
[3]	Scopus	Evensen, D. H., Glenn, J., & Salisbury-Glennon, J. D.	2001	A qualitative study of six medical students in a problem-based curriculum: Toward a situated model of self-regulation.	*Journal of Educational Psychology, 93*(4), 659–676.
[4]	Scopus	Badenhorst, E., & Kapp, R.	2013	Negotiation of learning and identity among first-year medical students.	*Teaching in Higher Education, 18*(5), 465–476
[5]	PsycINFO	Imafuku, R., Kataoka, R., Mayahara, M., Suzuki, H., & Saiki, T.	2014	Students' Experiences in Interdisciplinary Problembased Learning: A Discourse Analysis of Group Interaction.	*Interdisciplinary Journal of Problem-Based Learning, 8*(2), 1–18.
[6]	EBSCOhost	Imafuku, R., Kataoka, R., Ogura, H., Suzuki, H., Enokida, M., & Osakabe, K.	2018	What did first-year students experience during their interprofessional education? A qualitative analysis of e-portfolios.	*Journal of Interprofessional Care, 32*(3), 358–366.
[7]	ERIC	MacLeod, A.	2011	Caring, competence and professional identities in medical education.	*Advances in Health Sciences Education, 16*(3), 375–394.
[8]	ProQuest	Reddy, S., & McKenna, S.	2016	The Guinea pigs of a problem-based learning curriculum.	*Innovations in Education & Teaching International, 53*(1), 16–24.

Table 1. Articles included for full text review (in-dept analysis).

During the analysis of the 8 included articles, three main themes appeared relevant to discuss in relation to the research question. Firstly; the methodology used in the articles, secondly; how professional identity is conceptualized and finally how the relation between PBL and professional identity in medical education is visible. Themes that in one way or another can be regarded as a framework for the later discussion of the consequences or impact that a PBL curriculum has on undergraduate medical students´ professional identity development.

Nature of research

Of the 8 articles (see Table 2) for full text review, 7 contained empirical content utilizing qualitative approaches to data collection such as interviews, observations, self-reported statements and learning portfolio interviews, to investigate the relation between PBL and professional identity development in a medical education context [1,3-8]. The observations in the articles [4,5,7] were all conducted during PBL group sessions, group meetings or tutorials and the interviews in these articles were performed after or during the observation period. The articles using retrospective data as interviews [1,4,7,8], e-portfolios [6] and self-reported statements [1] were analyzing or interpreting the learner's own experiences with PBL. The last article [2] was identified as conceptual, since it is contained conceptual principles about current knowledge on enhancing active learning in PBL, and furthermore introduced some theoretical frameworks that may foster the understanding of the relation between active and self-regulated learning and professional identity development.

Ref. nr.	Research participants	Type of research
[1]	Third year medical students	Empirical (*self-reported statements*)
[2]	Conceptual article	Theory
[3]	First year medical students	Empirical (*observations and interviews*)
[4]	First year medical students	Empirical (*interviews*)
[5]	Third year medical students	Empirical (*video-recorded data*)
[6]	First year medical students	Empirical (*written e-portfolios*)
[7]	Undergraduate medical students	Empirical (*observations and interviews*)
[8]	Undergraduate medical students	Empirical (*interviews*)

Table 2. Learning context, research participants and type of research.

Conceptualization of professional identity

Professional identity in the included articles often refers to what a physician is, described as a representation of a position or a self, achieved in stages over time during which the characteristics, values, and norms of the profession are internalized through social interaction, agency, learning, reflection, acting, and feeling like a physician [1-8]. The authors of the 8

papers argue that professional identity is an adaptive developmental process that occurs both at the individual level of the medical student and as a result of socialization into a clinical role and professional community. Contained within these analytical descriptions from the articles, some principles of professional identity are brought forward: Professional identity development is a dynamic and developmental process that occurs in all medical students; professional identity is the result of social interaction and active participation in clinical practice; and professional identity develops from a series of identity transformations that occur primarily during periods of transition [1-8]. Each of the included articles contributes to various ways of examining the concept professional identity and thereby emphasises the challenge of doing research on professional identity development.

Relation between PBL and professional identity development in medical education
Below in table 3 the identified themes are listed to give an overview of the PBL concepts that are identified in the articles as influencing the professional identity development.

Themes in articles	References
Social interaction	[1-8]
Self-reflection	[1,2,3,5,7,8]
Proffesional community	[1,2,3,5,6,7,8]
Problem solving	[5,6,7,8]
Self-directed learning	[2,3, 5,8]
Cultural enviroment	[2,3,4,5,7,8]
Learning	[1,3,4,5,6,8]
Real patient learning	[1,2,5,6,7,8]
Active participation (agency)	[1-8]
Communication/ Language	[1,2,4,5,6,7,8]
Negotiating subject positions	[4,5,6,7,8]
Opportunities for learners	[2,3,4,7,8]
Rolemodel	[2,6,7]

Table 3. PBL Themes that are represented in the included articles.

The results indicates that professional community, real patient learning, cultural environment, social interaction, agency and communication are important PBL competencies that affect professional identity development. Of the 8 articles 6 recommend PBL as pedagogical approach to enhance professional identity development in undergraduate medical students' [1-3,5-7]. Thus 2 of the 8 articles problematized PBL in regards to the need for active participation, communication skills, opportunities for learners and learners as equal participants in the group sessions to generate learning [4,8]. These articles claim that PBL is best suited for capable students [4,8].

The three identified themes 1) nature of research, 2) conceptualization of professional identity and 3) relation between PBL and professional identity development in medical education deliver different perspectives on the connection between PBL and professional identity development, which will be discussed below.

DISCUSSION

Educational focus on professional identity development serves the need of preparing the medical graduates for the work as physician (Cruess, 2006; Hafferty, Michalec, Martimianakis, & Tilburt, 2016). Competencies as critical thinking, self-reflection, self-directed learning, communication and problem-solving skills have been emphasized as important goals of medical education, which also affect the developmental process through which medical students' form his or her professional identity (Niemi, 1997). However, little is known about how PBL curricula affect the professional identity development and the learning context and environment through which the personal experiences of the undergraduate medical students are elaborated. Thus, to our knowledge, this is the first scoping review conducted with the aim to explore and identify the existing literature concerned with the relation between PBL and professional identity development in a medical education context.

As presented in the results section the volume of research examining the relation between PBL and professional identity development is very limited despite the importance of professional identity development in medical education. In order to reduce the identified research gap, the purpose of this discussion is to inspire and contribute for further research, by discussing different theoretical approaches to professional identity development and alternative research methodologies to explore the relation between PBL and professional identity development in medical education.

New methodological approaches can apply important knowledge to medical education
As our results show, none of the included articles used ethnographic material to explore the relation between PBL and professional identity development in medical education. Thus, various social researchers have previously suggested that professional identity is primarily acquired through active participation in a professional practice, by observing how others behave and how they embody the values and behaviors of the profession (O'Brien & Irby, 2013). This argument suggests that social research in medical education can profitably take advantage of ethnography or methodological triangulation to better understand the complexities of the medical students' professional identity development in relation to PBL. Conducting ethnographic studies or methodological triangulation the researcher will gain a thorough insight into the process in which the medical students develop their professional identity. To produce knowledge that can explain this dynamic and complex development process, Leung (2002) suggest that one has to employ methods such as participant observation and unstructured

interviewing and put emphasis on the influence of the curriculum. Moreover, the formal, as well as the informal PBL curriculum, contains important knowledge to the research field of professional identity development. To go beneath the surface of the existing research and produce new knowledge, ethnography or method triangulation will allow us to untangle this research field and give a deeper understanding of how a PBL curriculum transforms the students (Leung, 2002). While other types of qualitative methods such as interview, self-reported statements and portfolios may be used to investigate students' perceptions, they cannot uncover the influence of prior socialization or learning on their perceptions.

Professional identity development in medical education
As the results shows in this scoping review the individual level is more or less absent. Thus, these new theoretical lenses could put forward new and interesting perspectives on the relation between PBL and professional identity development and thereby contribute to a unique approach to the delivery of undergraduate medical PBL curriculum.

The reviewed articles affiliate with a certain perspective that points out the need of the undergraduate medical students' to engage in a professional community to develop a professional identity. The theoretical perspective, can be closely tied to the concepts of community of practice (CoP) presented by Lave and Wenger. They suggest that social interaction between individuals enhance learning, and that CoPs emerge when those who wish to share a set of common approaches and shared knowledge and standards that create the basis for action, communication, problem solving, performance, and accountability (Wenger, 2001). CoP as a concept and PBL is often seen as a particularly helpful relation because they appear to reflect the reality of both medical education and practice (Dolmans & Schmidt, 1996; Lave & Wenger, 1998). A perspective that seems to capture the description of the practice of medical education that is presented in the included articles [1-3,5-8] and the idea that becoming a member of a community of practice is one of the major ways in which students begin to form their professional identities, often through as a dynamic process of legitimate peripheral participation (Lave & Wenger, 1998). It should be kept in mind that CoPs illustrate only one way of expressing the development of professional identity. Therefore, the research field demands attention towards the role of the individual and new theoretical approaches in a varied manner to explore and support the PBL curriculum improvement.

Social identity theory can subject the positions available to the medical students to a critical examination and support the preferred theoretical lens on CoP and turn the research focus towards the importance of the environment and context in which the PBL is practiced.

Tajfel & Turner (2004) and Jenkins (2014) propose that social identity theory refer to the way in which we understand ourselves to be a member of a group, along with an emotional connection to our group membership(s). As such, group membership is a very central aspect within all our identities. In the context of real patient learning, case work, group work and the

learning environment in which the medical students work and learn contributes to their social identity in different ways: through their developing sense of self as a member of the group of students or physicians, and as a member of the department in which they work. Furthermore, the engagement within the work as a physician and the level to which they are included, also contribute to their professional identity (Turner, 1987). Another theoretical perspective presented by Jarvis-Selinger, Pratt & Regehr (2012) claims that professional identity development is an adaptive process occurring at two levels: the individual level of psychological development, which occurs primarily within the individual; and the collective level, whereby the individual learns through interaction in the social context (Jarvis-Selinger, Pratt & Regehr, 2012). Students' learn and make meaning of their environment through the mental structures or schemata they develop. As students learn and develop, these schemata become increasingly complex and form the basis for self-reflection, self-directed learning, problem-solving and communication skills (Dolmans & Schmidt, 1996; Tajfel & Turner, 2004).

PBL as a catalysis for developing professional identity in medical education
PBL is often a debated medical education pedagogy and has been widely recognized as a progressive student-centered active learning approach and currently underpins the philosophy of the entire medical education curriculum (Barrows, 1990; O'Brien & Irby, 2013; Quirk, 2006). Even though there is no universal definition of what constitutes PBL and a conceptual uncertainty lingers in the literature both in terms of its underlying philosophy and in how it is executed. Thus, PBL advocating an experience-based learning environment that encourages collaboration to identify what to learn and how to solve a problem and they apply their new knowledge to the problem and reflect on what they learned of the strategies used (Barrows, 1996; Hmelo-Silver, 2004; O'Brien & Irby, 2013; Schmidt & Rikers, 2007).

Medical education appears enraptured with the intention of developing professional identity in medical students to prepare them and make them "fit in" to the work life (Hafferty, Michalec, Martimianakis, & Tilburt, 2016). PBL as defined by Barrows (1996) intend to prepare the students in the transition from medical school to working life by putting the students in real life learning environments. Cruess & Cruess (2014) argue that students should be supported in the transition to becoming a physician and that medical schools ought to devote more attention to the development of professional identity. In this respect, we would like to add on this perspective of Cruess & Cruess (2014), even though training in professional identity development at medical school most certainly will help medical students adjust in their career. We believe that an extended focus on the relation between PBL and professional identity development is needed during the transitions in the whole education program. With a perspective on medical education as a site of occupational socialisation and a site where the PBL curriculum sets the agenda for learning, then Hafferty (2016) argue that socialisation theory could contribute to an insight into identities that medical students assume. Furthermore, Hafferty addresses socialisation theory as a theory we can draw upon in exploring topics such

as behaviour, attitudes, self-image, self-reflection, occupational culture, values, norms and emotions (2016).

The development of professional identity in undergraduate PBL medical education serves an important purpose (Barrows, 1990; Murray & Savin-Baden, 2000) and to our knowledge, this is the first scoping review conducted to summarise the existing research currently available on this topic and to that end we encourage to further research to bridge the knowledge gap identified.

CONCLUDING REMARKS

In this paper, we have presented a scoping review of a sample of the research literature about the relation between PBL and professional identify development. More specifically, we have tried to answer the following question: How is the relation between problem-based learning and professional identity development represented in the field of medical education research? As it turned out, there was not much evidence in the sample of included articles on PBL we reviewed that could be used to clarify the specific relation between PBL and professional identity development in medical education. We found that none of the 8 included articles explicitly conceptualized professional identity or PBL, but used the concepts as common terms. However, we could identify a pattern of the use of professional community, that could be used to provide an adequate unifying picture of what affects professional identity development in medical students.

The most important conclusion that can be drawn based on the findings we have been able to produce, is that even though the topic of professional identity development in medical education has been studied quite extensively, there is a lack of knowledge about how new types of pedagogical approaches such as a PBL curriculum influences medical students' professional identity development. Thus, it is impossible to draw any final conclusions on how PBL affect the professional identity development in medical students and therefore more and varied research is needed.

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