Why and how? Case-based teaching in interprofessional and interdisciplinary education

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ABSTRACT

The field of interprofessional education is complex and intricate. Students from different professions, who have distinctive knowledge bases, develop a mutual understanding of how to work together in future professional environments. The aim of this article is to explore case-based teaching (CBT) as an approach to develop and provide effective teaching, preparing students for future work. Specifically, the article focuses on *why* and *how* CBT may be a useful approach in interdisciplinary and interprofessional education. A traditional scoping literature review is conducted to provide a broad overview of the field. The analysis ended up with three themes: (1) the theoretical foundations for CBT, (2) the reasons given for using CBT and (3) the process of case production. The article discusses how CBT, by taking complex real-world situations as a point of departure, may facilitate active learning strategies that promote relational agency and critical thinking through meta-learning. In this way, CBT prepares students to handle problems that they are likely to encounter in their professions.

Keywords: *case-based teaching; critical thinking; interdisciplinary; interprofessional; relational agency*

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SAMMENDRAG

Hvordan og hvorfor? Casebasert undervisning i tverrfaglig og tverrprofesjonell utdanning

Interprofesjonell utdanning er et komplekst og sammensatt felt. Studenter fra ulike profesjonsutdanninger møtes med sine særegne kunnskapsbasert for å utvikle en gjensidig forståelse av hvordan de kan samarbeide i sine framtidige profesjonelle sammenhenger. Målet med denne artikkelen er å utforske «case-based teaching» (CBT) som en tilnærming til å utvikle og realisere effektiv opplæring, og forberede studentene på deres fremtidige

arbeid. Artikkelen fokuserer særlig på *hvorfor* og *hvordan* CBT kan være en nyttig tilnærming til tverrfaglig og tverrprofesjonell utdanning. Gjennom en litteraturstudie fikk vi et bredt overblikk over feltet. Analysen endte opp med tre temaer: (1) det teoretiske grunnlaget for CBT, (2) begrunnelse for å benytte CBT og (3) prosessen knyttet til å utvikle case. Artikkelen diskuterer hvordan CBT ved å ta utgangspunkt i realistiske, praksisnære situasjoner legger til rette for aktive læringsstrategier, noe som igjen kan fremme metalæring knyttet til relasjonell aktørkompetanse og kritisk tenkning. Slik kan CBT forberede studentene på å håndtere problemer de vil møte som profesjonsutøvere.

Nøkkelord: *tverrfaglig utdanning; tverrprofesjonell utdanning; kritisk tenkning; relasjonell aktørkompetanse; casebasert læring*

Introduction

Case-based teaching (CBT) has been utilised by legal and business educators since the late 1800s. Over the years, this approach has spread to education in different professional fields, such as health care and social work. According to Giacalone (2016), "CBT is an active learning strategy in which students apply their knowledge and their analytical skills to complex, real-life scenarios relevant to the subject matter" (p. 2). In CBT, students are introduced to a case that includes challenges from fields of practice. CBT therefore gives a possibility to strengthen interdisciplinary and interprofessional aspects of higher education. In this article we use the term *interdisciplinary* when referring to situations where two or more disciplines (i.e. medicine, psychology, sociology) align resources (Parse, 2015). Most educations in the fields of health, teaching and social work will have interdisciplinary aspects in their curriculum. The term *interprofessional* is used to refer to settings where professionals (i.e. teachers, social workers, nurses) offer their disciplinary knowledge to collaborate on challenges individuals or families meet (Parse, 2015).

In Norway, the government stresses interprofessional competences as important skills for higher education students aiming to enter the welfare professions (Regulations for joint learning outcomes for health and social work education, 2019). To strengthen professional public services, the new curriculum in higher education states that all students in the health care and social work professions must learn how to initiate and support interprofessional and cross-sector cooperation. However, interprofessional education challenge traditional discipline- and profession-based programs. Students struggle to overcome barriers to interprofessional work, such as lack of knowledge about each other and stereotyping of other professions. Furthermore, students from different professions with a variety of knowledge bases strive to develop mutual understanding of how to work together in fields of practice. Therefore, they need to learn how to deal with complexity, to understand each other's languages and perspectives and to share theoretical foundations (Barr et al., 2014; Lewitt et al. 2015). As Anna Stetsenko (2017) claims, "the world constantly created and recreated, invented and reinvented, changed and transformed, and thus – realized by and through human agency which is a this-worldly process of contributing to

social changes that bring forth the world (p. 206)". Hence, higher education needs to prepare students to handle situations that are complex and context sensitive, do not have one correct answer, involve risk and uncertainty (Lund & Vestøl, 2020, p. 1).

Case-based teaching (CBT) can be a way to overcome the challenges faced in interprofessional education. To develop high quality interprofessional teaching, educators need knowledge about *why* CBT may be a useful approach and *how* relevant cases may be constructed. The aim of the study is to provide such knowledge. To make a broad overview of CBT in interprofessional education we carried out a traditional scoping literature review (Pham et al., 2014).

There is confusion and overlap regarding the terms used to describe CBT in educational settings. In general, *CBT* refers to teaching and the teacher's perspective, while *case-based learning* (CBL) focuses on students' perspectives and outcomes. The focus of this article is CBT, not CBL.

Furthermore, the article emphasises the didactical purposes and preparation of interprofessional education, rather than teaching processes and learning outcomes.

In the following, we present the methods used for the review. We then give account of the results divided in three themes: theoretical foundations for CBT, reasons for using CBT and the process of case productions. We then discuss the results using the concepts of *relational agency* (Edwards, 2005, 2011) and *meta-learning* (Bateson, 1972). Finally, we discuss some identified knowledge gaps.

Methods

Materials

We conducted a traditional scoping literature review of the field of case-based interprofessional teaching. According to Pham et al. (2014), a scoping review seeks to present an overview of a potentially large and diverse body of literature pertaining to a broad topic. Such reviews generally include a wide range of study designs and methodologies and provides a descriptive overview without critically appraising individual studies or synthesising evidence from different studies. In our literature review, we followed Pickering and Byrne's (2014) stages: (1) define topic, (2) formulate research questions, (3) develop a search string using identified keywords, (4) assess articles for relevance, (5) screen articles using inclusion and exclusion criteria and (6) analyse the final sample.

Search string

We developed and conducted several searches in the electronic databases EBSCOhost and Scopus. The searches were limited to articles published between 2000 and 2018. Qualitative and quantitative studies as well as literature reviews and systematic reviews were included.

We started out by limiting the search string to CBT in interprofessional education. This search provided a limited number of hits. However, methods for designing cases

and teaching methods used in CBT in interdisciplinary education are also relevant to interprofessional education. The similarities between using CBT in interprofessional and interdisciplinary education are that students must combine knowledge from different subjects or fields, as well as working in groups on cases that they may meet in future practice. Moreover, as CBT has a long tradition in interdisciplinary education, we therefore decided to include this term in our search.

Different combinations of the following keywords were used to search titles and abstracts: 'interprofessional' or 'inter-professional' or 'inter professional' or 'interdisciplinary' or 'inter-disciplinary' or 'inter disciplinary' or 'multiprofessional' or 'multi-professional' or 'multi professional' or 'multidisciplinary' or 'multi-disciplinary' or 'multi disciplinary' or 'crossprofessional' or 'cross-professional' or 'cross professional' or 'crossdisciplinary' or 'cross- disciplinary' or 'cross disciplinary', 'case-based' or 'case based' or 'case method' or 'CBT' or 'CBL'.

Exclusion/inclusion

Articles were excluded through a three-stage process (see Figure 1) in which their relevance to the research questions was examined. In the *first stage*, after removing the duplicates (40 in total), 392 articles were read and assessed based on their title and abstract. In total, 252 obviously non-relevant articles were excluded. The excluded articles did not address our subject, instead using case studies as a research method or using the abbreviation CBT to refer to cognitive behavioural therapy. In the *second stage*, the remaining 140 articles were briefly examined by reading the abstract and, when necessary, the full text. Through this process, an additional 47 articles were excluded. These articles dealt with interprofessional work only, with no attention paid to CBT in education. At the *third stage*, the full texts of the remaining 95 articles were read thoroughly. As a result, 28 non-relevant articles were excluded after realising that they did not relate to our research questions. Through hand-searching, an additional eight articles were included. The final sample included in the review is comprised of 73 articles.

Identification	392 after duplicates are removed
Screening (in steps)	252 obviously non-relevant 47 for a variety of reasons 28 additional non-relevant In all, 327 articles are excluded
Hand-searching	8 articles included
Final selection	73 articles included

Analysis

We carried out a qualitative, thematic analysis of the data material, identifying and reporting themes within the material (Braun & Clarke, 2006). The dominant themes

from each study were identified, and most studies featured more than one theme. The analytical process was inductive; we searched for and were guided by richness, variety and diversity in the material rather than by looking for predominant ideas in the use of CBT in interprofessional and interdisciplinary education.

We found research on CBT linked to a variety of educational programs, such as business, military, law, medicine, pharmacy, dentistry, health professions, social work and education. The articles mainly covered interdisciplinary collaboration within a profession. 13 of the 73 articles dealt with CBT and interprofessional teaching, while the remaining 60 articles focused on interdisciplinary teaching. Some of the articles on CBT in interprofessional contexts dealt with collaboration only among different health care professions (i.e. Nitz et al., 2013; Peeters et al., 2017; Sutherland & Moline, 2015; Wallace & Benson, 2018), and some included social work and other professions (i.e. Curran et al., 2008; Ellman et al., 2012; Hadley et al., 2018; Wharton & Burg, 2017).

We identified three themes through the analytical process: (1) theoretical foundations for CBT, (2) reasons for using CBT and (3) the process of case production. The themes are interlinked, as theoretical foundations may provide reasons for the use of CBT as well as suggest directions for the construction of cases. Some of the articles presented exemplary cases but no explicit theoretical foundation. Others presented explicit theoretical foundations but no description of the production and use of the case. Further, some articles mainly dealt with case-based learning but were included in the material because they presented rich descriptions of the case construction or reasons for using cases. The process of case production was the most prevalent theme, covering different aspects of how to construct relevant cases. We therefore developed subthemes to cover this complexity.

Results

Theoretical foundations for CBT

According to the Interprofessional Education Collaborative Expert Panel (2011), interprofessional education in the field of health care suffers from a lack of guidance from appropriate theories. This observation is relevant in other interprofessional educational fields. A main finding is that the theoretical foundations for CBT often are implicit and draw on a communicative framework and principles of *storytelling*. Storytelling is a central and fundamental part of meaning-making processes in human thinking (Andrews et al., 2009). A story is a report of real or imaginary connected events. It is a contextualised experience and a complex real-life scenario that is relevant to the subject matter (Giacalone, 2016).

The few articles that presented a theoretical framework, referred to a variety of theories, including social constructivist theories on learning (i.e. Dori & Herscovitz, 2005; Stauffacher et al., 2006), situated learning (Peeters et al., 2017), narrative theory (Andrews et al., 2009; Dori & Herscovitz, 2005) and experiential and social learning

(Chu et al., 2012; Newton et al., 2015). In our view, all these theories are used to understand learning within a communicative framework, which implies an understanding of the student as an active participant in learning processes. This fits with the idea that team collaboration and meaning-making are central for interprofessional and interdisciplinary learning.

Reasons for using CBT

There are various reasons for using CBT in interdisciplinary and interprofessional education settings, and some common reasons can be identified (Hardin et al., 2016; Kim et al., 2006). CBT is superior to more traditional methods of instruction in many ways (Kolb & Kolb, 2009; Richards & Inglehart, 2006). By taking real-world situations as a point of departure, CBT challenges learners to engage in problems that they are likely to encounter in their professions. A well-constructed case can also help students to understand important elements of real-world situations so that they can be better prepared for similar situations (Kim et al., 2006).

Students need to be educated in the practical requirements and *core competencies* in their field of practice. Several articles point out that case work gives students experiences that can enhance core competencies in interprofessional education (Goldberg & Koontz, 2014; Gooding et al., 2016; Newton et al., 2015). The identified studies partly overlap in terms of which competencies are strengthened through interprofessional education. In the context of health care education, Goldberg and Koontz (2014) suggest that the core competencies that are achieved through CBT are understanding the perspective of the patient, appreciating and respecting the contributions of the range of the professions involved and being able to work and communicate effectively with all stakeholders. Gooding et al. (2016) state that interprofessional case work may strengthen students' abilities to develop mutual respect and shared values, work effectively as an interprofessional team, understand the roles and responsibilities of team members and communicate in a manner that supports the team approach. Newton et al. (2015) refer to the Canadian National Interprofessional Competency Framework (Orchard et al., 2010), which identifies the following domains as important in interprofessional education: (1) patient/client centredness, (2) collaborative communication, (3) role understanding, (4) team functioning, (5) shared leadership and collaborative decision-making and (6) conflict resolution. While the core competencies mentioned above primarily come from the field of health care education, these interprofessional competencies are relevant to practitioners from other fields as well.

CBT also promotes active learning and can engage learners in *higher-order thinking*, such as analysis and synthesis (Newton et al., 2015; Savery, 2015). Several studies underline how a case-based method involves students in a way that deepens their understanding and *critical thinking* (DeMarco et al., 2002; Head & Bays, 2010; Hofsten et al., 2010; Leon et al., 2015; Nava-Whitehead et al., 2011; Norman, 2004).

Head & Bays (2010) argue that open-ended cases stimulate decision-making and critical thinking skills. Hofsten et al. (2010) claim that CBT facilitates critical thinking, and suggest that this is developed when students discuss, verbalise and test ideas in case seminars. Furthermore, reflection and critical thinking can be promoted when students work with cases that challenge their ability to handle multi-layered and complex dimensions (Norman, 2004).

We find that the educational reasons for using CBT can be summarised as follows: promoting critical thinking as well as analytical and reflective thinking, understanding diversity and complexity in real-world situations and combining theory and practice. This can lead to increasing interest, motivation and in-depth learning, engaging in ethical reflection and performing interprofessional collaboration. In all, this can prepare the students for tomorrow's workforce by the active construction of knowledge.

The process of case production

In this section, we start by presenting some overarching ideas about case production and then discuss three sub-themes related to case production: (1) case content, (2) case producer and (3) case design and format. These sub-themes are closely related and sometimes difficult to separate. Nevertheless, we will address them separately. The question of *how* students work with cases is also sometimes closely connected to the three sub-themes but will not be addressed in the analysis.

Overarching ideas in case production

When constructing a case for teaching, some studies recommend starting by defining goals, identifying skills and deciding which concepts the students should learn. Through this process, teachers carefully consider the learning outcomes that should be achieved by the students (Duffrin, 2003; Savery, 2015). Newton et al. (2015) state that case production can be either open-ended or directed by challenges or questions depending on the purpose of the teaching and the student group. Cases should be produced to heighten students' interests by using stories to which the students can relate.

Kim et al. (2006) reviewed literature on how to construct cases across disciplines. They explored and synthesised 17 recommended strategies and identified five core attributes or guidelines to which one must pay attention while constructing a case. First, the case must be *relevant* to the students. This means that the goals and objectives of the teaching and setting of the case narrative must be taken into consideration. Second, the case ought to be *realistic* so that the students will perceive the case as authentic in relation to their field of practice. Both pertinent and unnecessary information can be included to simulate the challenges of real-life data collection. Additionally, teachers could consider disclosing information gradually so that the content of the case develops over time. This could create points at which

students must engage in clinical decision-making and provide stages for teaching and assessment. Third, to make the cases *engaging* for the students, the cases should be multi-layered, with rich voices and perspectives. As Kim et al. (Kim et al., 2006) comment, "Cases can allow learners to elicit information from multiple sources and examine problems from a variety of perspectives" (p. 871). This will support the realism and relevancy of the case. Fourth, the case should be made *challenging* for the students by including rare situations, adding or withholding information, or adding problems or ambiguity in order to engage students' prior knowledge. Fifth, it is important to address the *instructional* and pedagogical aspects of the case. Students' knowledge and skills should be assessed, and students should be provided with specific feedback. Additionally, the case work should include various teaching aids to support students' learning.

Case content

The first sub-theme of case production is case content, defined as any materials used to construct or inform a case that contribute to the professional content (Newton et al., 2015). We found a wide variety of material used to construct cases for students in CBT in different educational fields. In some fields, historical cases and news were relevant. In others, cases were derived from professional practice. Below, we provide some examples of the various materials that were utilised to develop cases.

We found several articles in which *clinical cases* were developed for CBT. Some clinical cases were *fictional* and resembled actual patients (Gooding et al., 2016; Hark & Morrison, 2000; Owens et al., 2002; Richards & Inglehart, 2006). Others built upon *real-life* case scenarios and re-enacted case scenarios (Bradley et al., 2010; Chu et al., 2012; Newton et al., 2015; Stauffacher et al., 2006). Additionally, some cases included meetings between students and real patients as central points (Nasir et al., 2017), and some included research data (Carmichael & Tscholl, 2013).

Cases were also built around *current events*; the students were presented with actual situations from business, industry, and professional communities in relevant areas (Cornely, 2003). Sometimes, students formed partnerships with workplaces and worked to solve actual problems, creating a win-win situation (Anyansi-Archibong et al., 2000).

Mass media and art were also used as case content. Dinan (2006) suggests that newspapers and magazines, television programs, movies and even song lyrics can act as hooks to grab students' interest.

Case producer

Our analyses showed that a variety of people construct cases, including faculty members, students and practitioners. *Faculty members*, such as teachers and researchers, may work alone or in groups to produce cases (Hark & Morrison, 2000; Weiss & Levison, 2000). Weiss and Levinson (2000) describe a case production process

involving faculty members across disciplines, in which one faculty member sketched up a rough draft of the case that was circulated among the faculty whose disciplines pertain to the case. Then, a meeting was called, and the case was reviewed and finalised.

Sometimes the *students* produced the case, which was considered an important learning opportunity (Gilbee et al., 2014; Head & Bays, 2010; Hodgson et al., 2014; Spencer et al., 2006). Through case construction, students can identify relevant issues or tensions in work settings. The effort of defining and reframing such problems can support the students' development of problem-solving skills (Spencer et al., 2006). Gilbee et al. (2014) present a project in which students constructed cases with material from their interprofessional clinical placements and then presented the cases to fellow students with prepared questions from different professions. Based on the results of this project, the authors claim that constructing case presentation is an effective way to develop students' confidence and clinical knowledge (Gilbee et al., 2014). Another example was described by Spencer et al. (2006), who examined case writing pedagogy in early childhood leadership education. The students in this example explored leadership theories and current issues in early childhood mental health, identifying tensions from their work settings and developing problem-solving skills, including defining and reframing problems.

Sometimes, a patient or user case is provided by a *practitioner*. For example, Koole et al. (2014) described an online case-based course in which undergraduate dental students discussed a patient case authored by a periodontist. The case included relevant information, such as treatment history and diagnostic information, and the online student discussions were supervised by the periodontist, who performed the treatment.

Some studies describe cases that were produced through *collaboration* between faculty members, students and/or practitioners (Anyansi-Archibong et al., 2000; Hardin et al., 2016; Head & Bays, 2010). For example, at the University of Michigan, sustainability project cases were primarily created by teams of faculty members and students together with a practicing decision-maker. In this project, cases were shared on a dynamic, interactive digital platform that allowed case participants to exchange tips and reactions. Participants across the world were also allowed to suggest updates or revisions, creating possibilities for intercultural engagement (Hardin et al., 2016).

Case format and design

We found variation and richness in the ways in which the cases were presented to students. The formats and designs varied in complexity, which had an impact on how the students worked with the case. Sometimes, the initial case could be expanded through the learning process (Carmichael & Tscholl, 2013). Traditionally, cases are presented in the form of *text on paper.* For example, Hark and Morrison (2000) report on a textbook in which each chapter presents clinical cases for use in CBT. Now, text-based cases are often *digitally presented* (Bradley et al., 2010).

Furthermore, we found several studies that present *multimodal* cases in which a variety of information sources are combined, such as texts, video programs, audio programs, websites and films (Bennett, 2009; Gillham et al., 2015; Hardin et al., 2016). For example, Gilham et al. (2015) designed CaseWorld, an e-learning case for nursing students that provided students with the opportunity to view authentic cases unfold in a rich multimedia context. Students were challenged to make clinical decisions by drawing upon a variety of resources, such as research evidence, expert clinician interviews, multidisciplinary content, input from other students and selected videos. The patient perspective, diverse patient journeys and psychosocial elements were also included. In a course on legal history, Bennett (2009) included films in addition to, for example, court decisions, historical documents, novels, essays and research. In some professional fields, complex situations from practice is demonstrated through *role-play* as part of the case presentation (Lee et al., 2009; Norman, 2004). Additionally, sometimes, professional actors are used to add an element of authenticity to the case (Goldberg & Koontz, 2014; Herremans & Murch, 2003).

We found that cases varied in *complexity* depending on the educational goal. Some cases were small and linear, giving students only limited information with which to work. Other cases were complex, with various contextual settings, and emphasised different issues, such as the cultural components of health, public health concerns, emergency preparedness and ethical dilemmas (Newton et al., 2015). Reviewing 100 studies across disciplines, Kim et al. (2006) found that cases could include both pertinent information (positive and negative) and unnecessary information to simulate the real challenge of data collection and synthesis. The authors stressed that in real-world scenarios, not only is irrelevant information present but also relevant information may be missing. However, they warn that adding too many distractors can create unnecessary complexity.

Cases varied in terms of how case content was presented. In many cases, all content was presented simultaneously. In some cases, information or elements of the case were gradually revealed (Anyansi-Archibong et al., 2000; DeMarco et al., 2002; Newton et al., 2015). For example, in the Health Care Team Challenge model, students learned about, from and with one another while practicing skills and acquiring relevant knowledge and attitudes. The process started with a case describing an acute situation for the students. The student teams shared their preliminary ideas about solving the case. Then, teams were presented with additional information that was relevant to the case, and each team was challenged to adjust its solutions to incorporate the new information (Newton et al., 2015).

Additional findings

Overall, the analysis showed that educators combined traditional lectures with social interactions between students. CBT was used in groups of varying sizes and over periods of time ranging from one day to several weeks or months and could be part of a course at campus or connected to a practicum.

When working on a case in groups, students shared knowledge with each other and combined knowledge from different areas (Kim et al., 2006). Collaborative learning played a central role in this process. CBT required students to draw upon their established knowledge and make decisions about problems they may encounter in practice (Bender et al., 2008; Biggs & Tang, 2011; Giacalone, 2016; Nadershahi et al., 2013a, 2013b; Snyder & McWilliam, 2003). Furthermore, the case-based curricula encouraged students to be involved in the active construction of their knowledge. CBT focused on the concrete and specific, was student-focused, and addressed decision-making in 'messy' contexts. Overall, the approach aims to promote learners' critical skills and thinking capacities (Hardin et al., 2016; Kim et al., 2006).

Discussion and conclusion

The aim of this review was to explore how relevant cases are developed for inter-professional education. Before starting the review, we asked ourselves *why* CBT could be useful and *how* relevant cases can be developed. A main finding is that CBT, by taking complex *real-world situations* as a point of departure, facilitates active learning strategies that promote critical, analytical and ethical thinking and prepare students to handle problems they are likely to encounter in their professions.

Another main finding is that CBT studies often lack an explicit theoretical foundation. The field comes across as relatively practical, with an implicit understanding of learning and teaching. Through interprofessional education, students and teachers from different fields bring diverse theoretical and professional perspectives to inter-disciplinary interactions and discussions. If left unaddressed, this may cause challenges for interprofessional education and the use of CBT. *Making the theoretical foundation for CBT in interprofessional education more explicit* could strengthen the necessary connections between learning goals, teaching material and content and teaching methods.

In the following, we will introduce Edwards' (Edwards, 2005, 2011) concept of *relational agency* to discuss how CBT can promote core competencies related to inter-professional and interdisciplinary collaboration. We will then introduce Bateson's (1972) concept of *meta-learning* to discuss how CBT can be used to develop values and critical thinking in interprofessional and interdisciplinary learning. Finally, we comment on knowledge gaps in the field.

Developing relational agency

Interprofessional education builds on practical situations that professionals experience when collaborating with other professionals and/or clients. The review revealed that a number of articles note that case work gives students experiences that enhance core competencies related to interprofessional practice, such as patient/client centredness; ways to efficiently work and communicate; understanding,

appreciation and respect for each other's roles; and collaborative decision-making and conflict resolution (Goldberg & Koontz, 2014; Gooding et al., 2016; Newton et al., 2015).

CBT can enhance students' collaboration skills by having them work on tasks that resemble real-life situations. The concept of *relational agency* (Edwards, 2005, 2011) may be useful to understand this process and which kinds of tasks teachers may include in interprofessional casework. According to Edwards (2005, 2011), relational agency involves working with others to strengthen purposeful responses to complex problems. Specifically, she defines it as a "capacity which involves recognising that another person may be a resource and that work needs to be done to elicit, recognise and negotiate the use of that resource in order to align oneself in joint action on the object" (Edwards, 2005, pp. 169–170). By taking complex situations as a point of departure, CBT can be one way to build relational agency. Each student must recognise what matters for the other professionals involved, be able to understand how other professionals interpret the problem and how the others and themselves can be resources in the situation at hand. Moreover, each student must develop the ability to recognise and negotiate the resources of others to adjust themselves in joint action to solve the common problem on which they are working. Edwards (2011) argues that relational engagement with the knowledge and motives of others can produce *common knowledge*, which is a partially shared understanding of what matters for others in interprofessional collaboration. In turn, this knowledge can mediate responsive professional action. Edwards (2011) further suggests that interprofessional collaboration that merely aims to achieve action, without paying attention to the production of common knowledge, is insufficient.

An important issue to consider is whether CBT aims to promote learning techniques or developing understanding, values and attitudes. Edwards (2005) argues that practitioners who have developed expertise only by following procedures may have weak professional agency when working with unpredictable objects outside their institutional shelters. She suggests that it is important to rethink professional development to increase focus on building strong forms of collaborative agency in professional decision-making while working on unpredictable problems.

Developing values and critical thinking through meta-learning

An important aim of CBT in interprofessional education health care and social work is that cases involve students in ways that deepens their understanding, promotes ethical reflection and supports critical thinking (DeMarco et al., 2002; Head & Bays, 2010; Hofsten et al., 2010; Leon et al., 2015; Nava-Whitehead et al., 2011; Norman, 2004). How can we theorise and understand these complex learning processes?

According to Gregory Bateson's (1972) learning theory, learning always occurs on different levels at the same time. While learning about *specific issues*, such as a clinical case, students also learn on a *meta level*, which indirectly involves attitudes

and values that are relevant to the issues at hand. Following this, ethical and critical thinking in CBT may be developed simultaneously and implicitly when students discuss specific real-world situations. For example, when students from different professions meet, they compare, discuss and consider their different knowledge bases and methods. Furthermore, students deal with realistic stories that are characterised by complexity and ambiguity. Working with such stories provide the students with opportunities for developing ethical and critical reflections. We can say that students thus can engage in meta-level learning about attitudes and values.

Bateson (1972) considers values to be by-products of the learning process and stresses, and states that "We have to find the value of a planned act implicit and simultaneous with the act itself, not separate from it in the sense that the act would derive its value to the reference to a future end or goal" (p. 160). CBT in interprofessional education may be a unique opportunity to promote students' critical thinking and professional judgment. These are crucial aspects in ethical and reflective professional practice. However, the connection between the three aspects of CBT—theoretical foundations, reasons for using CBT and the production of cases—must be clear in order to support students' meta-learning in this complex field.

Knowledge gaps and conclusion

As a result of this review, we identified some knowledge gaps. First, studies on the use of CBT in interprofessional education show a lack of explicit theoretical foundations. As mentioned above, a clearer theoretical foundation would support the development of cases that promote core competencies in interprofessional work. Furthermore, empirical research on CBT within interprofessional education across the fields of health, social sciences and education is limited. In the future, teaching professions could be included in interprofessional CBT as important collaborators for students in the welfare professions. Furthermore, there is a need for longitudinal studies to investigate how case-based interprofessional education can promote interprofessional collaboration. Finally, the characteristics of beneficial CBT should be empirically investigated.

To conclude, students who aim to enter professions that require interprofessional collaboration need to have interprofessional learning experiences during their education. These learning experiences should include activities that enhance students' understanding of the patient, student and client perspective, appreciation and respect for the contributions of various professions and ability to effectively work and communicate with all stakeholders.

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