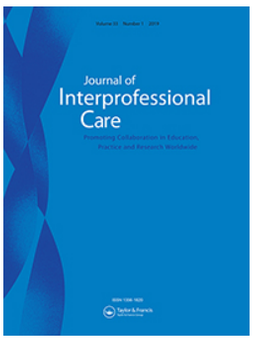

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Emotions and clinical learning in an interprofessional outpatient clinic: a focused ethnographic study

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ABSTRACT

During the last decade, there has been a growing recognition that emotions can be of critical importance for students' learning and cognitive development. The aim of this study was to investigate the self-reported and the observed relationship of: activity-, outcome-, epistemic-, and social emotions' role in students' learning in a clinical interprofessional context. We conducted a focused ethnography study of medical and nursing students' clinical placement in an interprofessional orthopaedic outpatient clinic where the students performed consultations with patients, together. We used content analysis to analyse observational notes and interviews. Two themes were identified. First *self-regulated learning* with two sub-themes: *unexpected incident* and *reflection*. The second theme was *cooperative learning* with three sub-themes: *equality, communication*, and *role distribution*. Participants only reported activating emotions. Negative emotions often occurred when the students together experienced an incongruity between their cognitive capability and the type of task. However, because of the possibility for students to call for a supervisor, the negative activating emotions often, in connection with reflection on the incident, resulted in a positive emotion due to the students' awareness of having acquired new knowledge and capability, and thereby, learning. It is important to be aware of the close interplay between emotions and clinical learning in an interprofessional context. The learning environment must include easy access for supervision.

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Interprofessional; clinical learning; outpatient clinic; emotions; focused ethnography

Introduction

During the last decade, there has been a growing recognition that emotions resulting in interest, boredom, joy, anxiety, happiness, etc., are part and parcel of learning (Pekrun, 2011). Emotions represent an individual's reactions to stimuli, accompanied by their judgement of the situation and the context (Valiente, Swanson, & Eisenberg, 2012). For example, if a medical or nursing student is going to see a patient, they can enjoy reading the patient record and maybe revise their anatomy knowledge. However, even if they are well prepared, they can feel nervous when calling the patient and get frustrated if the patient's problem is different from expected. The experienced emotions such as joy, nervousness and frustration, can be of critical importance for the student's learning and cognitive development (Anthony, Artino, Holmboe, & Durning, 2012; Pekrun, 2011; Schuwirth, 2013). Positive as well as negative emotions can be activating or deactivating. For example, enjoyment might result in pride, which is a positive activating emotion. Satisfaction can result in relaxation, which is a positive deactivating emotion. Frustration and anger are negative activating emotions, while uncertainty and unmanageable or tedious experiences can result in negative deactivating emotions of hopelessness (Pekrun, 2011). The question is how these emotions influence clinical learning?

Other researchers have initiated the exploration of the significance of emotions to clinical learning. Dornan and colleagues explored the relationship between emotions and identity in clinical education and found an uncovered link between medical students' emotions and their identity development of becoming a doctor (Dornan, Pearson, Carson, Helmich, & Bundy, 2015). Because of this connection, they recommend more focus on helping the students to express their emotions as an aid for developing caring identities. Doulougeri and colleagues also explored medical students' emotions and the associated emotion regulation strategies, and found that the most frequently mentioned emotions were negative and deactivating (Doulougeri, Panagopoulou, & Montgomery, 2016). On the other hand, Helmich and colleagues reported that medical students during an early nursing attachment frequently experience positive and negative emotions at the same time (Helmich, Bolhuis, Prins, Laan, & Koopmans, 2011). A rather worrying finding was that when sharing their emotional experiences, students prefer to talk to fellow students or family and friends outside the medical school (de Vries-Erich, Dornan, Boerboom, Jaarsma, & Helmich, 2016).

We only identified one study concerning emotions and learning in an interprofessional clinical placement. That study examined students' self-reported learning experiences and emotions in the context of an interprofessional training unit. The study found a significant correlation between the intensity of the possibility for joint construction of knowledge in connection with the ongoing activity and the students'

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formation of positive emotions (Lachmann, Ponzer, Johansson, Benson, & Karlgren, 2013).

It appears from the above, that there is a close connection between experienced emotions and learning. However, more research is needed in this area to understand how best to arrange learning environments where students learn to work under a wide range of emotional conditions (McConnell & Eva, 2012).

All but one of the referred studies dealt with uniprofessional settings and address emotions as a whole. However, when wanting to design interprofessional clinical learning environments that are conducive to emotions as drivers of learning, we think it would be helpful to go one step further and differentiate between different kinds of emotions and also examine which learning situations cause these different emotions.

Background

Pekrun (2011) describes two dimensions of emotions: valence and activation. When talking about valence, Pekrun distinguishes between positive emotions (e.g. pleasant states such as enjoyment) and negative emotions (e.g. unpleasant states such as boredom, anxiety, and frustration). Furthermore, Pekrun distinguishes between activating (e.g. excitement) and deactivating (e.g. relaxation) states. Pekrun (2011) then groups emotions according to their object focus and he distinguishes between activity-, outcome-, epistemic-, and social emotions. Activity emotions can include pleasure or boredom during the activity. Pride is an example of an outcome emotion if things work well, whereas trepidation might be the resulting outcome emotion if things do not work out well. Epistemic emotions pertain to learning and cognitive activities, and are as such about cognitive incongruity, which can incite surprise and frustration. Finally, as humans, we might experience what are called social emotions such as envy or joy. These social emotions are also evoked when learning takes place in a context where the attending persons socially judge the emotions, whether positively or negatively, in terms of social norms. Pekrun's framework gives us a pre-understanding that we can use to obtain a deeper insight into the emotions that could have critical importance for the students' learning, their cognitive and identity development, in the interprofessional clinical placement setting.

The aim of this study was first to investigate the self-reported and the observed relationship of the four types of emotion: activity-, outcome-, epistemic-, and social emotions. Second to analyse the valence and activation of these types of emotions and their role in medical and nursing students' learning in a clinical interprofessional context.

Methods

For this study, we used focused ethnography, which is appropriate for qualitative educational research

(Higginbottom, Pillay, & Boadu, 2013). Focused ethnography can be distinguished from traditional ethnography with long field studies by shorter duration of the observation time. In focused ethnography, the researcher must be sensitive, in particular, to preselected topics of inquiry. Furthermore, it is problem-based, context-specific and involves only a limited number of participants (Cruz & Higginbottom, 2013; Higginbottom et al., 2013).

With a special focus on emotions and learning, we observed medical and nursing students' clinical placement in the orthopaedic outpatient clinic. There is no consensus on how to study emotions in clinical environments empirically. Much qualitative research on students' learning in clinical interprofessional placements has been conducted using individual and focus group interviews (Reeves, Peller, Goldman, & Kitto, 2013). Relying only on participants' self-reported learning outcome includes a risk of recall bias (Bernstein, Erdfelder, Meltzoff, Peria, & Loftus, 2011) and social desirability bias (Hewitt, 2007). This risk could possibly be lowered when supplementing interviews with focused ethnography where the self-reported outcome is complemented with observation (Reeves et al., 2013).

When performing ethnographic studies, the researcher observes and interviews the informants and is as such involved in both the process and the product of the research enterprise. The authors discussed the importance of the researcher's background, preconceptions, and direct impact on the observed situations and the interviewee. Concerning background and preconceptions, the observer tries to regularly establish meta-positions where situations could be observed from another angle including being aware of new perspectives different from the observer's preconceptions (Berger, 2015; Malterud, 2001; Reeves et al., 2013). Three of the author team (FJ, TBH, and LK) knew the setting well, while the remaining two authors (AMM and PM) were unfamiliar with the setting and could as such challenge the first author to be open about decisions made in the research process, including collection and analysis of data and in the writing of findings and discussion.

The observer's impact on the consultations was discussed with students before data collection started. It was agreed, that the observer, instead of wearing a uniform, should wear private clothes, to avoid patients thinking of the observer as a senior surgeon or nurse. Furthermore, after having introduced themselves to the patient, the observer, as far as possible, should be out of the students' and the patient's vision.

Study setting and participants

We conducted this study in a busy orthopaedic outpatient clinic to which patients came for follow-up after fractures and orthopaedic surgery. The staff consisted mainly of surgeons, nurses and secretaries, but occupational therapists and physiotherapists were also represented. From 2015 the medical and nursing students' uniprofessional clinical placements were supplemented with an interprofessional initiative, where an interprofessional team of one 6th-year medical student and one 3rd-year nursing student, on two days per week examined and cared for three of the outpatients. Because the students were senior in their training, they were told that supervision would mainly be indirect and they were expected to be in the front line and responsible for their own decisions including calling for help if necessary. Furthermore, they were encouraged to communicate intensely with their fellow student about practical and clinical issues, but also about their

communication with the patients, their communication among themselves and their learning outcome.

The supervising surgeon or nurse selected the patients the day before the students would see the patients, so that the students could beforehand read the records. First thing next morning the students were expected to detail their plans to the supervisors thus receiving the necessary advice concerning the consultations. Subsequently, the students went to their assigned room where they made a final check of the patients' x-ray, blood test, etc.. Here they also discussed their individual roles before calling the patient. During the consultations, students were alone with the patients, but could call for help if necessary. After the three consultations, the supervisors provided the students with individual reflective supervision and finally the two students together, reflected on the professional and collaborative content of the day. The supervisor's intention was to challenge the students, through the use of manageable tasks. The students were in the front line and as far as possible completed the consultations without direct supervision. Nurses, surgeons, and students also had lunch together every day in the outpatient clinic. This gave the opportunity for supplementary informal professional discussions and social conversations. We have previously presented information about students' interprofessional learning experience and approach to learning in the same setting (Jakobsen, Morcke, & Hansen, 2017).

Data collection

Interviews

All medical and nursing students in the orthopaedic outpatient clinic during the data collection period were included in the study simultaneously with continuous analysis of observational notes and interviews. The first author used a semi-structured guide when interviewing the students (seven medical and three nursing students) one-to-one after the interprofessional experience. Interviewing was stopped when no new themes appeared in the analysis. Because the interviews were performed after the observer's notes were transcribed, the observer/interviewer had the opportunity to read through the transcripts and afterwards use the interviews for triangulation of the observational notes. The interviewer used the opportunity to question and pursue statements, to ask for examples, to ask why they thought it happened as it did. These could be related to attitudes, duties, rights, and emotions. An experienced secretary transcribed the recorded interviews verbatim followed by an immediate review of the interviewer to check for misunderstandings.

Observations

Data were collected by the first author who observed the students when they were supervised in a separate room before they saw the patients, when they prepared together for the consultations in the consultation room, when they were together with the patients, when they were supervised after they had seen the patients and finally when they evaluated the day in terms of their collaboration and their learning outcomes. All communication was sound recorded. Observational and reflective notes were written down, and immediately after the daily observation, the notes, supplemented by the sound recording, were transcribed. Observational data were collected during 12 days in the period from December 2015 until March 2016 and resulted in one observational and reflective note from each of the observational days, in total roughly 42,000 words. Study time comprised 72 hours observing supervision, preparation, and the execution of 31 patient consultations.

Observation was stopped when no new themes emerged from the data analysis.

Data analysis

Because we wanted to investigate the self-reported and the observed relationship of four types of emotion: activity-, outcome-, epistemic- and social emotions, their valence and activation, and their role in students' learning in a clinical interprofessional context we used an iterative stepwise content analysis (Elo & Kyngas, 2008; Hsieh & Shannon, 2005).

We started with reading the twelve observational notes and the transcripts of ten interviews several times to obtain a sense of the material. Bearing in mind that reality can be interpreted in different ways depending on subjective interpretation (Graneheim & Lundman, 2004), the coding was performed in an iterative process in four steps: 1) Using conventional content analysis, manifest meaning units with regard to the research aim were abstracted into a new document and labelled with preliminary codes including negative or positive emotions (Hsieh & Shannon, 2005). 2) When reviewing the preliminary inductive codes a pattern came up from which codes were grouped in five higher ordering categories (Elo & Kyngas, 2008) under two headings based on learning theory. Analysis was stopped when the same themes started to reappear. 3) We discussed and recoded some of the preliminary inductive codes, if there were only a very few counts of a specific code, to reach a final inductive coding. 4) Then we performed a deductive coding using content analysis with a directed approach (Hsieh & Shannon, 2005). This coding was based on Pekrun's (2011) framework of positive and negative activity-, outcome-, epistemic-, and social emotions to connect the framework with the inductively based sub-themes. Being aware that coded data in this study design cannot be compared meaningfully using statistical tests of difference; we instead reported the incidence of the codes representing the observed emotions.

Ethical considerations

According to the Danish National Committee in Health Research Ethics, studies based on interviews and observation are exempted approval by the committee (Central-Danish-Region, 2016). All participants volunteered, were informed of the project, and accepted that their statements would be presented anonymously. We explained thoroughly to the students that our aim with the study was to learn more about how to create the best learning environment and, that we needed their help for this. We emphasised to the students that the observer's focus was on the learning experience and not on their professional knowledge and capability. We asked the patients whether they would accept an observer in the room and for the consultation to be recorded. The patients

were informed that the sound recording was a supplement to the observer's written notes and that it would be deleted within one week. The observer's focus was on the students' learning experiences and not on the patient. Patients were free to deny the presence of the observer without any consequences for their further treatment. If the patients accepted this, they were asked to sign a document giving their permission.

Results

The results are presented according to the possible interplay between the themes and sub-themes comparing the examples of negative and positive activity-, outcome-, epistemic-, and social emotions (Table 1).

We identified two themes: *self-regulated learning* and *cooperative learning*. *Self-regulated learning* held two sub-themes: *unexpected incident* and *reflection*. The theme *cooperative learning* held three sub-themes: *equality, communication*, and *role distribution*. We found only activating emotions, thus no deactivating emotions (Table 1).

Self-regulated learning

This form of learning can be defined as 'the self-directive process by which learners transform their mental abilities into academic skills' (Zimmerman, 2002). As a part of their *self-regulated learning*, the students experienced *unexpected incidents* and *reflected* on their learning experiences.

Unexpected incidents

These were experiences that the students did not feel prepared for. As can be seen from Table 1, the vast majority of *unexpected incidents* were connected to negative emotions, primarily negative epistemic emotions (like frustration) and outcome emotions (like trepidation), but note that *unexpected incidents* were also connected to positive outcome emotions (like achievement).

The following are examples where two students, during a consultation, experienced three different negative emotions (activity-, outcome-, and epistemic emotions), but at the same time, in paradox, the *unexpected incident* also, during *reflection*, resulted in a positive outcome emotion:

> Example 1: The patient takes control.
>
> A patient came for follow-up after an operation for a fracture in the lower leg. The students' plan was to remove the cast, review a follow-up x-ray, remove sutures, and put on a new cast. In connection with the students accounting for the plan, one of the supervisors had asked: Have you considered discussing lifestyle factors (alcohol, smoking, exercise, and nutrition) with this patient? She might be malnourished. The medical student answered: Not really, but it might be a good idea. The nursing student said: The patient says that she is not having a substance abuse problem.
>
> When the students were alone, they discussed who should speak about lifestyle factors with the patient. Neither of them was keen to take on the task, but the medical student ended up saying: Then I have to give it a try.
>
> Because the patient asked many questions and was very talkative, the consultation lasted more than one hour. The medical student explained the importance of good nutrition for the healing of the wound and the fracture. He also asked: What do you drink? The patient answered: I only drink water and soft drinks, and I smoke 15 cigarettes per day and I will not stop that. The medical student persevered: How about alcohol? The patient responded: I am staying far away from that, you can forget about it.
>
> (Source: Observational note 11)
>
> After the consultation, the medical student said: Oh – I found it difficult to talk lifestyle factors with that patient. I think that I will be more in control next time I meet a patient like her – not tough, but more in control. She took over and we used a lot of time. I felt lost, as if she was in charge of the room.
>
> (Source: Interview 7)

This example illustrates, that both of the students experienced negative activity emotions (uncertainty and frustration) when discussing who should speak about lifestyle factors with the patient. The medical student also experienced negative epistemic emotions because of the patient's dismissive attitude to talk about lifestyle factors combined with the feeling that the patient was in charge of the room. However, all in all, the learning outcome from this unexpected incident that caused negative activating emotions was that the student found, that it is important to combine listening to the patient with being in control of the consultation (positive outcome emotion).

The *unexpected incidents* causing epistemic emotions included one-third of all negative emotions. The epistemic emotions concerned cognitive incongruity and, for example, incited surprise or frustration. However, the frustration gave the students an opening to discuss with each other and their supervisors and thus represented learning opportunities. The following is an example from two students discussing an x-ray:

> The students together examine the next patient's x-ray image.
>
> Nursing student: It is hard for me to see the fracture.
>
> Medical student: I am not super to see it either, but we can try to follow the edges, the question is – is it acceptable? I think we have to ask a supervisor.
>
> (Source: Observational note 7).

Table 1. Enumeration of recorded emotional utterances.

		Negative activating emotions				Positive activating emotions			
		Activity	Outcome	Epistemic	Social	Activity	Outcome	Epistemic	Social
Self-regulated Learning	Unexpected Incident	11	23	35	2	2	12	0	0
	Reflection	0	8	2	4	23	13	0	2
Cooperative Learning	Equality	2	0	1	1	4	6	0	13
	Communication	2	0	6	5	2	2	0	24
	Role Distribution	0	3	0	2	2	3	0	19
Total		15	34	43	14	33	36	0	58

This small excerpt is typical for the negative epistemic emotions, where within the situation there is an immediate discrepancy between the student's cognitive capability and the nature of the task.

Below we give another example that includes negative and positive outcome emotions during one learning experience. What is illustrated here is another *unexpected incident*, this time where things looking very different from that expected, caused negative activating epistemic emotions (frustration), and these on *reflection* resulted in a positive activating outcome emotion (one cannot take things for granted) and thus functioned as a driver of learning.

> Example 2: A cicatrice that looked different from expected.
>
> It is morning and the students explain to their supervisors what the plans are for their patients that day. The first patient has undergone a minor operation for a (Dupuytren) contracture in the hand. The students apparently regard this consultation as a minor routine task. They say that they will check the neuromuscular conditions and remove the sutures.
>
> The supervisor later told the observer that she thought that the students were a little overconfident with this patient, given the cicatice often would be open and messy to look at. But on purpose, she would let them see for themselves. The students called for the patient and said, that they would remove the sutures. When the bandage was removed and they saw the wound, they were uncertain and said: It is a little open, we need to call for a supervisor.
>
> The supervisor came and said that it looked normal and explained that they could remove the necrosis. (Source: Observational note 3)
>
> During the interviews, the students said how they were quite shocked seeing the open and messy cicatrice. However, they also found that the experience gave them a good lesson: that you cannot take things for granted. They realised that both supervisors knew that it might not necessarily be a 'nice' cicatrice, but they also found that it was good that they got this experience.
>
> (Source: Interview 2 and 3)

This example illustrates, that the students experienced an unexpected incident causing negative epistemic emotions (uncertainty and frustration) when the cicatrice looked very different from what was expected.

The students found, that the learning potential from these negative emotions was that one cannot take things for granted, which was interpreted positively by the students (reflective positive outcome emotion).

Reflection

This was mainly connected to positive emotions, primarily positive activity emotions (like pleasure) and outcome emotions (like achievement) (Table 1), but note that *reflection* was also connected to negative outcome emotions (like trepidation).

The positive activity emotions included reflections on the feeling of being accepted in the professional community and on the value of the supervisor's expectations that the students were well prepared for the day. Another example was the interprofessional supervision in the morning, as expressed by a medical student who said:

> I enjoy the joint supervision where we as students together with both of our supervisors can plan the course of the day.
>
> (Source: Interview 9)

Furthermore, the students said, that the joint supervision simultaneously functioned as a place for planning and for learning.

Examples 1 and 2 illustrated how negative activating emotions after *unexpected incidents* could be transformed to positive activating outcome emotions during *reflection*. This is further illustrated in this excerpt from an interview that followed the *unexpected incident* described in Example 2. The medical student *reflected*:

> I think that both supervisors knew that it was not necessarily a nice cicatrice, but in fact, I think it was good that we had to find this ourselves – we learned from that.
>
> (Source: Interview 3)

There were relatively few negative outcome emotions linked to *reflection* during the interviews. Examples included students' annoyance over their own insufficient professional knowledge and capability resulting in the need to seek help from their supervisors.

Reflection was often induced by communication with a student colleague, a supervisor, or as here in an interview where a medical student described how emotions during the placement shifted from negative to positive outcome emotions:

> Interviewer: What did you think, when you first heard about your placement in the outpatient clinic?
>
> Student: I thought 'damn' because we were told on a Monday that we should start the next morning and we did not know anything about what should happen. So I thought, will we just be allowed to get started? But now, after having been there, I have learned so much from being thrown in at the deep end, I have learned to make decisions and to believe in my own competences. I know that I can always call for help, if necessary.
>
> (Source: Interview 9)

This shift from negative emotions to positive emotions in connection with starting up the placement was a common phenomenon for most of the students who felt ill-prepared for the task. In hindsight, during *reflection*, they appreciated that together with their student colleague they were given the responsibility along with the possibility of calling a supervisor in order to give optimal care and treatment to the patients.

These examples described the results of the theme *self-regulated learning* that was characterised by *unexpected incidents* and *reflection. Unexpected incidents* predominantly induced negative emotions with epistemic emotions as the most dominant, while *reflection*, where the students reflected on their communication and activities, to a larger extent included positive emotions. Interestingly, during students' *reflection*, either alone, with their student colleague, their supervisor, or the interviewer, part of the negative emotions could shift to positive outcome emotions connected to learning.

Cooperative learning

This type of *learning* is a type of peer learning, which has been described as 'structuring positive interdependence' including shared goals and defined roles (Topping, 2005). As part of *cooperative learning*, the students experienced issues concerning *equality*, *communication*, and *role distribution* (Table 1).

Equality

The medical and nursing students on the course have different personal and professional attributes, so when we talk about *equality*, we mean their sense of equality in their situation and context. As can be seen from Table 1, *equality* was mainly connected to positive emotions, primarily concentrating on social emotions (like joy). Positive *equality* emotions were expressed when the students were together with the patient as illustrated in this observational note where the student team is seeing a patient who comes for replacement of a plaster cast and removal of sutures:

> The nursing student cleans the patient's skin and removes the plaster cast.
>
> The medical student tells the patient: The wound has healed really well.
>
> Nurse student to the patient: You may not move your thumb now the plaster cast has been removed.
>
> Medical student asks the patient about paraesthesia and tells him to be aware of this with the new cast.
>
> Nurse student removes the sutures.
>
> Medical student to nurse student: Do you want me to position the patient's thumb?
>
> Nurse student: Yes, please.
>
> (Source: Observational note 4)

In the situation described above, the students were equal and shared a common goal (to remove a plaster cast and sutures). According to the observational notes and the interviews, the students generally experienced positive social emotions when they – as in the above situation – were equal and they both participated in solving the task.

Communication

We here consider *communication* as conveying thoughts and meanings between the two students. As can be seen from Table 1, *communication* was also mainly connected to positive social emotions. In Example 3, we give an illustration of positive social emotions demonstrated mutually by the students, when they together prepared for, and conducted the patient consultation, when they evaluated their collaboration, and when they just talked privately about their plans for future professional and private life:

> Example 3: Communication between the students
>
> The students are alone in the consultation room preparing together to see three patients. They discuss distribution of tasks, e.g., who will call the patient and who will start the conversation with the patient.
>
> The nursing student asks the medical student if she has tried to remove staples – which she has not. Therefore, the medical student is interested in removing the staples under the supervision of the nursing student.
>
> They bring in the patient and have some dialogue with the patient and with each other, while the medical student removes the staples.
>
> When the patient had left the room, the nursing student says to the medical student that she had done well and asked if it was difficult, to which the medical student answered: No, it was good.
>
> In all of the three consultations that morning both of the students demonstrated equality in the situation, while communicating and collaborating when examining and treating the patients.
>
> After the consultations, the students evaluated the morning. They agreed that they had experienced a constructive and educative morning. The medical student told the nursing student: I think you will become a damn fine nurse. The nursing student replicated: I think you will be a clever doctor. They also took time to talk about their plans after graduation, where they would live, how much they could earn, etc.
>
> In the following supervision, both of the students emphasised that they as students had felt equality and with the help of their mutual conversation had acquired new professional and communicative knowledge and capabilities.
>
> (Source: Observational note 9)

This example illustrates, that both of the students, experienced positive social emotions linked to their communication and their practical work and they conveyed the positive emotions to each other.

The experienced positive social emotions may be contributory to the creation of a safe learning environment with room for the positive outcome emotion pride related to success.

Role distribution

This is about how the students share the tasks when performing patient consultations. As can be seen from Table 1, *role distribution* was primarily coded with positive activating social emotions.

Typically, the *role distribution* connected the students socially in a positive way, as exemplified below in this conversation between two students:

> Medical student: Shall we share equally so that we do not talk over each other?
>
> Nursing student: OK. Shall we call for the patient together? It was fine when we did it last time. We start with checking that we had the correct patient and ask how he is doing.
>
> Medical student: We can then discuss pain, wound, range of movement, and urination.
>
> Nurse student: And we will check the cicatrice, oedema, functional level, and if he is informed about phasing-out the medicine.
>
> (Source: Observational note 11)

The above excerpt illustrates how equality, common goal and collaboration contributed to the formation of positive social emotions.

One of the few negative social emotions concerning *role distribution* was demonstrated in a situation where the medical student was taken by surprise because the nursing student took on a stronger presence than he thought they had agreed.

This resulted in the medical student saying to the nursing student: In fact, I want to talk with the next patient, all alone – and furthermore, I prefer to call for the patient myself (Source: Observational note 10).

Afterwards in the interview, the medical student experienced negative outcome emotions when thinking back on the situation. The student explained that it was perhaps an overreaction making him solely responsible for talking with the patient (Source: Interview 7). In another situation, it was the medical student who took the lead and the nursing student acted as an assistant (Source: Observational note 1). In the interview, the medical student reflected over the *role distribution* by saying that maybe we should have discussed the *role distribution* before the consultation (Source: Interview 1). In the interview with the nursing student, she said that she had worked together with the same medical student another day where they had discussed the *role distribution* before the consultations resulting in a more equal distribution of tasks, resulting in positive social emotions (Source: Interview 2).

We have now described the results of the theme *cooperative learning*, which was characterised by the sub-themes *equality, communication*, and *role distribution*. All three subthemes elicited positive activating social emotions, indicating that the medical and nursing students enjoyed learning with and from each other in the interprofessional setting.

Discussion

In this article, we have presented examples of possible learning outcomes caused by the association between emotions and students' performance of tasks in an interprofessional context. We found three clusters of experienced emotions (Table 1). Two of these clusters are placed in the theme *self-regulated learning*, namely 1) *unexpected incidents* with negative activity emotions, negative outcome emotions and negative epistemic emotions and 2) *reflection* with positive activity emotions and positive outcome emotions. The third cluster is placed in the theme *cooperative learning* and contains 3) positive equality emotions, positive communication emotions and positive role distribution emotions.

Zimmerman (2002) defines *self-regulated learning* as a 'self-directive process by which learners transform their mental abilities into academic skills'; this process consists of three phases: 1) forethought phase; 2) performance phase; 3) self-reflection phase. These three phases are included in Example 2. In the forethought phase, the students analysed the task (unfortunately, they underestimated the level of complexity); their goal and strategic planning was to check the neuromuscular conditions and to remove the sutures. In the performance phase, when they were together with the patient, they experienced negative epistemic emotions simultaneously yet succeeding in practising self-control when they saw the open and messy cicatrice. According to the students' following remarks, they performed self-observation by describing their surprise over the appearance of the cicatrice without letting the surprise be visible for the patient. According to Zimmerman (2002), the self-reflection phase encompasses self-judgment and self-reaction. Obviously, the students judged their self-observed performance as good because they succeeded in keeping their countenance towards the patient despite their surprise at the appearance of the cicatrice. In accordance with the emotions framework (Pekrun, 2011), the negative epistemic emotions the students experienced gave them a positive learning outcome. Thus, negative activating epistemic emotions from the learning activity (e.g. the open wound) promoted the students' cognitive development and learning. Confusion and frustration during learning presumably gave rise to second-order reflection on existing cognitive schemas (Clark, 2009; Pekrun, 2011). Likewise, our findings are also in line with Anthony et al. (2012), who concluded that 'under certain conditions, frustration during learning may actually promote meta-cognitive engagement, particularly in high-performing students who have high levels of self-confidence in their academic ability'. In our study, it was the students´ reflection on the negative activating emotions that resulted in a positive outcome emotion. The students thus self-regulated their learning by using meta-cognitive and meta-emotional strategies and adapted their knowledge and skills to the demands of handling difficult and surprising situations in the outpatient clinic (Pekrun, 2011).

It appears from the results that under the theme *cooperative learning* there is a cluster of positive activating emotions distributed on 'equality', 'communication' and 'role distribution'. This part of the result may be explained by the theory of cooperative learning, where the students work together on reaching a common goal while sharing resources, complementing each other and celebrating their success together (D'Eon, 2004). These are 1) Positive interdependence experienced by the students because they were equal in the situation and they had a common goal of giving care to the patient. 2) They interacted with each other in discussion and joint decision-making. 3) They were individually accountable, each being responsible and contributing in the consultation. 4) Subsequent joint reflection on professional task solution and internal collaboration.

Another explanation of this cluster of positive activation emotions could be that the supervisors provided interprofessional pre-consultation with both of the students with both of the supervisors present. The supervisors intention was to help the students to observe, analyse, and reflect (Jakobsen et al., 2017). During the supervision, the supervisors, as recommended in the literature, demonstrated equality in communication and role distribution and as such acted as role models for the students (Brewer, Flavell, & Jordon, 2017; Saunders, Dugmore, Seama, Singer, & Lake, 2018).

Very few negative emotions concerning role distribution were found in this study. Sources of conflict in interprofessional education can be role boundary issues, scope of practice and accountability (Brown et al., 2011; Hall, 2005). It is natural that conflict in a team can arise and this can both be problematic and promoting for the group process. When there is no friction or conflict in a team, this can result in 'groupthink', with no debate between the group members, which again can result in lack of creative thinking (Reeves, Lewin, Espin, & Zwarenstein, 2010). The conflict where one of the students was taken by surprise, because the other student took a stronger presence than expected, caused a negative role distribution emotion, which opened the student's eyes to the necessity of clarifying their mutual roles when collaborating.

In this study, we found many negative emotions. Experiences that lead to anger, hopelessness, anxiety or shame can result in negative deactivating emotions (Anthony et al., 2012; Pekrun, 2011, 2014). For example, Doulougeri et al. (2016) found that when medical students during training experienced negative incidents, these were mainly associated with negative emotions, which often resulted in inaction. According to Bond (2009) student anxiety including the negative emotion shame, which has a detrimental effect on learning, is well documented in the clinical training of nursing students (Bond, 2009). Another study support Bond's (2009) findings saying that increased stress and anxiety beginning in nursing school inhibits learning and increases attrition (Turner & McCarthy, 2017). However, in this study, we found more positive than negative emotions (Table 1). Indeed, we only found activating negative and positive emotions and thus no deactivating emotions.

There can be four possible explanations for this. First, the supervisors ostensibly lived up to their intention of creating a safe and challenging learning environment, and made demands on the students by giving them an authentic role with controllable and valuable tasks as recommended in the literature (Pekrun, 2011). We found that when the students experienced an incongruity between their cognitive capability and the nature of the task, this triggered a negative activating emotion, and their resulting extrinsic motivation might have improved their learning and performance. This finding is different from another study, where negative emotions (like anxiety) correlated negatively with motivational factors use of learning strategies (Anthony et al., 2012). Because the students in the safe learning environment felt that their learning activities were controllable and valuable (Anthony et al., 2012), they felt free to share their emotional experiences with their fellow students and their supervisors as opposed to the findings from another study where students, when sharing their emotional experiences, preferred to only talk to fellow students or family and friends outside the medical school (de Vries-Erich et al., 2016).

Second, informal learning took place at three different levels (Nisbet, Lincoln, & Dunn, 2013): a) implicit unintended learning, e.g., when the students where alone and discussed their future plans or when they had lunch with the staff from the outpatient clinic and as part of the group had the possibility to listen and observe their future colleagues and unintentionally model their behaviour; b) reactive learning took place, e.g., when the students planned a consultation and let their implicit knowledge or doubt become explicit for their student colleague or when they, after the consultation, critically reflected on their professional behaviour and their mutual communication; c) deliberative learning took place when the students presented and discussed the course of a consultation with their student colleagues.

Third, the medical and the nursing student are during their education socialised into different cultures, and therefore bringing in two different cognitive maps. When they looked at the patient together they often may not focus on the same issue (Petrie, 1976). A study found that power relations of the medical hierarchy seem to have a strong influence on emotional displays and thus on learning in an interprofessional context (Sebrant, 2008, 2014). However, because the students in the orthopaedic outpatient clinic felt equal in the situation and they had the common goal of helping the patient, they shared their observations and learned from each other. Finally, finding only activating emotions contributes to the focus on work-based learning which has gained legitimate central participation in the interprofessional practice (Bleakley, Bligh, & Browne, 2011).

This study was not without limitations. All results derived from the same setting with only a few participants, this may reduce transferability to other settings. The authors FJ and TBH have been working in interprofessional education in the same hospital, for more than a decade and LK has been deeply involved in developing the interprofessional program in the outpatient clinic. This can induce bias because their preconceptions may have resulted in misinterpretation of the data. However, AMM and PM were unfamiliar with the setting and could as such contribute to a trustworthy interpretation of the data. In spite of these limitations, we hypothesise, that the results can be used to perhaps inspire others to establish more interprofessional clinical placements in outpatient clinics and to raise awareness of the importance of knowledge and the use of emotions in clinical learning. The patients accepted treatment by students, but future studies should query into how this decision reflected the interest of the patients.

Concluding comments

The findings of this study corroborate the close interplay between emotions and learning described in the literature (Anthony et al., 2012; Artino & Naismith, 2015; Lachmann et al., 2013; Pekrun, 2011). As such it corroborates the need for an interprofessional student team working and learning in an outpatient clinic. It appears from the results that negative emotions caused from *unexpected incidents* were activating and in the *reflection* phase resulted in positive activity and outcome emotions. Moreover, it is worth noticing the many positive social activating emotions caused by the students' work in the interprofessional team.

The students' *self-regulated learning* and *cooperative learning* is promoted by a clear structure that matches the students' cognitive and practical capabilities with predominantly indirect supervision before the students saw the patients and reflective supervision after the consultations.

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Declaration of interest

The authors report no conflict of interest. The authors alone are responsible for the writing and content of this article.

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