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ABSTRACT

This paper demonstrates a practical dimension to the discussion about threshold concepts. Threshold concepts have thus far mostly been acknowledged to elucidate learning processes mainly connected to theoretical concepts. By exploring situations that prompted experiences of autonomy and authenticity in clinical learning, findings showed how a practical experience could have the same power to transform thinking and identity as theoretical thresholds and serve as a trigger for transformational learning, therefore making the discussion about 'practical thresholds' or thresholds in practice possible. The present study explores situations that prompted autonomy and authenticity, and offers context for and substance to these situations by adopting variation theory and the threshold concept framework. In order to learn more about situations that prompt experiences of autonomy and authenticity, and create prerequisites for such experiences, this paper examines how students discern and interpret these situations by analysing them through variation theory and the threshold concept framework.

Introduction

In this study, we propose to illuminate crucial aspects triggering professional development by analyzing critical features of autonomy and authenticity, and the surrounding situations providing meaning to these phenomena. Studies carried out in medicine and health care practices implicate that student's perceptions of authenticity is central in their learning processes becoming professionals (Sutherland and Markauskaite 2012); (Lave and Wenger 1991); (Kreber 2010). By exploring situations that prompted experiences of autonomy and authenticity in clinical learning, findings showed how a practical experience might have the same power to transform thinking and identity as theoretical

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thresholds and serve as a trigger for transformational learning, therefore making the discussion about 'practical thresholds' or thresholds in practice possible.

In a study by Fredholm et al. (2015) and in Fredholm (2017) it was shown that there is a strong link between experiences of autonomy and perceptions of authenticity, and professional development. The students in this study were asked to describe situations where they had experienced development and/or challenge in the clinical setting and both autonomy and authenticity appeared to be vital to learning and professional development. Previous studies (Manninen 2014; Fredholm et al. 2015) have shown the impact of authenticity on in-depth learning and professional development. Manninen (2014) presents authenticity as external and internal, where external authenticity is created by being in the real clinical environment meeting real patients, whereas internal authenticity refers to student feelings of really making a contribution to the clinical work and being a member of the team. Fredholm et al. (2015) and Manninen (2014) showed similar findings, also indicating the importance of the relationship with the patient as a factor for creating authenticity.

Analyzed with the help of the social theory for learning (Wenger 1991; 2010), autonomy becomes connected with practice, community, identity and meaning, thus moving away from autonomy as a personal trait alone and toward autonomy as a social phenomenon. However a gap of knowledge regarding the nature of situations creating autonomy and authenticity came to the fore revealing a lack of understanding of vital aspects concerning professional development.

Background

To conduce to the theoretical analysis situations that prompted experiences of autonomy and authenticity, context for and substance to situations were explored through the threshold concept framework combined with variation theory. Variation theory (Marton and Trigwell 2000; Runesson 2006; Ling and Marton 2011) is proposed to be a powerful means for describing and revealing conditions for learning, and the threshold concept framework (Meyer and Land 2005; Baillie, Bowden, and Meyer 2013; Land, Rattray, and Vivian 2014) provides perspective on the transitional aspects of learning.

As proposed by Åkerlind, McKenzie, and Lupton (2011) and Baillie and colleagues (Baillie, Bowden, and Meyer 2013), we found it fruitful combining threshold concepts and variation theory to further elucidate student's learning experiences. Variation theory is a theory accounting for differences in learning, and it provides a theoretical ground to understand some of the necessary conditions for learning (Runesson 2006; Ling and Marton 2011). According to variation theory the core of learning consists of discernment and variation. 'There is no learning without discernment. And there is no discernment without variation' (Marton and Trigwell 2000, 381). The way that we experience a situation is dependent of how we discern the critical features of this situation (Marton and Trigwell 2000; Pang 2003; Marton and Pong 2005; Marton 2006; Ling and Marton 2011).

> Discerning means that a feature of the physical, cultural, symbolic or sensuous world appears to the subject, and is seen or sensed by him or her against the background of his or her previous experiences of something more or less different. (Marton and Trigwell 2000, 386)

Thus, it is not possible to discern something as such. The discernment (or the experience) is always the result of a discernment of variation, or a discernment of difference of

some sort (Marton and Trigwell 2000, 386). The space for learning therefore is the potential for variation, or difference, provided by the situation, not the situation per se. Runesson (2006) defines the learning space as a space created of dimensions of variation of critical aspects. Thus, the learning object always consists of phenomena that are part of a situation. A situation is always situated in time, space and has a social dimension Marton and Booth (1997). A phenomenon and the surrounding situation are intertwined and the phenomenon gives relevance and meaning to the situation and the situation provides perspective and context to the phenomenon.

Threshold concepts are about knowledge and cognition in relation to a theoretical content in abstract constructions (Meyer and Land 2005). They are described as 'conceptual gateways or portals' (Meyer and Land 2005, 373) that lead to previous inaccessible ways of thinking of something, a new way for the learner to experience, perceive, interpret and understand a phenomenon changing the internal view of a subject matter, subject landscape or even world view (Meyer and Land 2005, 373). Land, Rattray, and Vivian (2014) depict this transformation as a cognitive tunnel where the liminal space within the tunnel is entered when triggered by a threshold concept, or as Savin-Baden (2008) suggests a 'disjunction', that challenges previous held ideas about something. Disjunctions according to Savin-Baden (2008) are 'spaces' or 'positions' accomplished through the realization that knowledge is troublesome, for instance after encountering a threshold concept, moving the learner into a liminal space that can be transitional and transformational. Learning in the liminal space often entails oscillation between different states and emotions. The liminal space is characterized by a stripping away of old identities, oscillation between states and personal transformation (Savin-Baden 2008). Land, Rattray, and Vivian (2014) describe coming out of the tunnel as a shift in learner subjectivity, a discursive shift, or a shift of a conceptual, ontological or epistemological nature.

In connection to variation theory and discernment, it can be interpreted that a threshold is a variation perceived by a student as so extensive that it changes the way the learner can view an 'old concept'. The old view is thus so challenged that it creates a disjunction that cannot be ignored by the learner. This disjunction can be perceived as a threshold. Variation theory provides further explanation to the learning processes connected to threshold concepts. In order to discern something from its context, you have to identify it as a particular 'something' and assign meaning to it – without this meaning and 'shape' of something it cannot be delimit from its context (Marton and Booth (1997); Pang (2003). This is referred to as the referential aspect and represents the overall meaning of a phenomenon, the whole. Marton and Booth (1997) explain this by using the terms internal and external horizon, where the internal horizon is connected to the internal structure of a phenomenon (how the parts are connected to the whole and so on) and the external horizon, how the perceived context or situation 'holds' the phenomenon, i.e. perception of other similar contexts or situations. Our awareness of something is dependent of our pre-understanding of that something. Runesson (2006) suggests awareness is a totality of all our experiences, however, differentiated, so that some things can be at the center of our attention, and others more in the background. Thus, some features or aspects are discerned, whereas others are not, i.e. how something is experienced is made up by the simultaneous discernment of features of that which is experienced (Runesson 2006). This is important in connection to understand what students will perceive as troublesome in their learning process.

Learning thus becomes a change in discernment brought on by a change in awareness of a phenomenon by the learner (Runesson 2006). Qualitative changes in a way of seeing the object constitutes learning and can be compared to the transformation described in the threshold concept framework. For every object of learning, there are critical aspects that the learners must be able to discern (Ling and Marton 2011). From a variation theory perspective, this is perceived as a matter of discrimination and differentiation, and learning seen as the ability to discern differences.

Threshold concepts have thus far mostly been acknowledged to elucidate learning processes mainly connected to theoretical concepts. However, the focus on professional development and learning in practice in this study makes it interesting to expand on the recent reasoning concerning threshold concepts into threshold conceptions or 'practical thresholds'. Deriving from, and depending on the Threshold Concepts Framework and Capability Theory (based in variation theory), Baillie, Bowden, and Meyer (2013) proposes the Threshold Capability Integrated Theoretical Framework for the design of university curricula, aiming to develop students' ability to deal with previous unseen situations. Here, they have developed the idea of threshold concepts into threshold conceptions, with the difference that conceptions hold the learners subjective interpretations of the theoretical content in concepts. Baillie, Bowden, and Meyer (2013) describe threshold capabilities as thresholds to professional learning in a defined area of knowledge. Several capabilities combined will contribute to the development of overall knowledge capability, i.e. the ability to deal with previous unseen situations and by working out key aspects, relating to previous knowledge, determining the problem, designing a solution, and having the ability to follow through (rather than know a lot about, i.e. nursing) 'think like a nurse'. Capability development is created in situations of discernment, real professional tasks, opportunities to trial solutions, reflection on experience, feedback and formal assessment of processes and not only of outcome (Baillie, Bowden, and Meyer 2013), Thus, threshold capabilities consist of both concepts and conceptions. *In order to learn more about situations that prompt experiences of autonomy and authenticity, and create prerequisites for such experiences, this paper examines how students discern and interpret these situations by analysing them through variation theory and the threshold concept framework.*

Methodology

The study was conducted within a hermeneutic ontological framework interpreting participants' experience in a life-world perspective. It is argued here that the lifeworld is mediated through narratives where individuals' subjective understanding and sense-making of their lifeworld become visible (Ricoeur 1976). Students were asked to relate a situation where they had felt that they developed, moved forward, where something happened that stayed with them – and also related to an opposite experience where they were challenged. Thus, within the larger theoretical framework of hermeneutics, we are analyzing experiences of the life-world through narrative data. These narrative data are analyzed through a theoretical analysis as the mean for organizing the data, by Polkinghorne (1995) identified as the paradigmatic approach to narrative inquiry. This way the analysis moves from the stories collected as data to common elements producing a thematic structure or general concepts cutting across data (Kramp 2004; McCane, McKenna, and Boore 2001).

The second type of narrative inquiry is narrative analysis, which is based on narrative reasoning and moves from the particular data collected to a construction of stories. Here, the researcher construct the story using data collected in each story, by Kramp (2004) called a 'storied analysis'. In narrative analysis, data become integrated in the story, instead as with the paradigmatic approach, separated. The written story 'must fit the data while at the same time bringing an order and meaningfulness that is not apparent in the data themselves' (Polkinghorne 1995, 16). This type of analysis uses plot to tie together individual experience in order to create a context that helps understanding and give meaning to experience. The outcome of this analysis is a narrative or set of narratives (McCane, McKenna, and Boore 2001).

Data collection

The study was undertaken using narrative inquiry. Stories were collected as a mean of understanding experience as lived and told (Clandinin and Conelly 1994). Sampling was undertaken with a combination of convenience sampling and purposive sampling (decisions about educational programs, semesters, age, gender and educational background) in order to find students with a varied experience of clinical education. Within each educational program, snowball sampling (Polit and Beck 2008) was also used, starting with a contact person asking students to participate. All students received an information letter with the context and aim of the study stressing voluntarism and confidentiality. The tape-recorded interviews were between 45 and 75 min long and were transcribed verbatim. Narratives were captured by asking two open questions: 'tell me about a clinical situation you felt was important to you, a situation that has stayed with you, where you felt that you developed, went forward, learned something' and 'tell me about an opposite situation'. These open-ended questions were chosen to gain rich narratives and ensure a wide scope of inquiry and variation of clinical experience. To be able to secure as rich narratives as possible, a wide range of follow-up questions were asked, such as 'tell me more, why is that do you think, can you describe more in detail, why do you think it was like that?' etc. To check the interviewer's understanding, recapitulation and summaries were used during the interviews. Each interview started with a set of more 'common' questions regarding background variables, slowly moving towards deeper layers of meaning about the phenomenon under inquiry. A log book was kept capturing the researcher's reflections and thoughts about each interview.

Participants

Twelve interviews were conducted with students from different educational programs, age, gender and background in order to achieve variation. Four students were medical students, four nursing students, two occupational therapy students and two studied to become a biomedical analyst. All had started the clinical phase of their education, varying from semester 3–8. Two participants were male. Participants were between ages 20 and 50 with the majority between 20 and 30 years. Eight participants came from homes where one or two parents had an academic education. Three participants had parents with non-Swedish background.

Ethical considerations

The ethical principles adopted in this study that adhered to the principles of anonymity were possible secure data processing, transparency and minimality and lawful data collection. Ethical approval was obtained from The Regional Ethical Review Board in Stockholm. All participants received an information letter where the aim and context of the study were described. The letter stressed voluntarism and pointed out the right to confidentiality. Each interview opened with a presentation of the study and participants signing the informed consent paper. Confidentiality and the right to abort were stressed. The interviewer had no previous knowledge about or connections to the participants previous to or after the study to minimize the risk of any dependency issues.

Data analysis

The theoretical analysis was made up from the characteristics for threshold concepts. These characteristics are described by Meyer and Land (2005) as transformative, with a new understanding of discourse by extending the natural, formal or symbolic language, a liminal space with stuckness and disjunction, oscillation between states, being irreversible and integrative, constituting a transconfiguration of self and identity, being a loss of previous security, being troublesome and bounded. These characteristics were interpreted to be possible defining attributes for threshold conceptions as well. Hence, the theoretical analysis entails both concepts and conceptions.

Data analysis was undertaken to examine situations that prompted experiences of autonomy and authenticity attributes of threshold concepts, applying variation theory in order to find critical features of these phenomena. Furthermore, the theoretical representation of the cognitive tunnel (Land, Rattray, and Vivian 2014) was applied to the student's stories.

During the first phase of the analysis, it became evident that the theoretical analysis only functioned on units of description that had a 'breakthrough character i.e episodes that have an 'Aha-moment'. Mapping of narratives was adopted, a process suggested by Savin-Baden and van Niekerk (2007), following Denzin, in which narratives can be explored analyzing epiphanies. Denzin (1989) proposes four different types of epiphanies: cumulative, illuminative, major and relived epiphany, each with different degree of impact on people's lives ranging from minor impact to life-changing insights. In this study, the unit of analysis was the illuminative epiphany that is seen as 'a point in time or particular experience that reveals insights; or an event that raises issues that are problematic' (Savin-Baden and van Niekerk 2007, 465). Savin-Baden and van Niekerk (2007) point out that the transitional process of shifting into, through and out of an epiphany has not been discussed, and highlight the relevance in investigating them as a mean of analyzing people's storied lives. Following this line of reasoning, together with the above outlined theoretical reasoning around threshold concepts/conceptions, the 'aha-moment' is a narrated epiphany that may contain threshold concepts/conceptions.

The theoretical analysis of the narratives was conducted in three dimensions. The first dimension consisted of a more general reading and interpretation of the whole. Concretely, this was the identification of the situation itself with its features in relation to the demands for discernment and for possible threshold capabilities i.e the search for

illuminative epiphanies. The second dimension consisted of the search for threshold conceptions, i.e. the student's subjective interpretation of the situation and of the critical aspects of this situation. The most abstract dimension was the search for threshold concepts, the underlying theoretical constructions of concepts, and the critical aspects of these concepts. Were there similarities between these critical aspects, even if the situations themselves were very different?

Findings

Situations with an epiphany character where the students experienced challenge, or development, were all connected to a practical experience ranging from complex situations to more isolated events or even singular acts. Thus, critical aspects for this practical experience were practical action, be it in a complex situation, in isolated events or singular acts. The practical experience had the same characteristics as described in the literature for theoretical threshold concepts, i.e. they were transformative, integrative, insights obtained were usually irreversible and provoked a state of liminality. The practical experience always featured the student as the actor and showed the same power to transform thought, identity, and professional identity as do theoretical threshold concepts, and in nearly every case we could see that transformation was preceded by a liminal state.

Students' narratives all entailed information about the disjunction, of the liminal space and of the resulting shift. This was all related to a practical experience functioning as a trigger for moving into the tunnel, learning in the tunnel and coming out 'on the other side' of the tunnel with a changed view. The driving force for movement through the tunnel was the students' inner motivation for learning originating from the perceived meaning of the practical experience. The self-evident nature of the authentic practical experience, and the need to master these situations created movement and transformational learning. To illustrate the movement through the tunnel we will follow some students and take part of their experiences as examples of different stages in this process. These constructed narratives are depicting data seen through the theoretical lens of the tunnel metaphor. Table 1 depicts movement into, through and out of the tunnel with triggers and consequences referring to examples from the constructed narratives.

Moving into the tunnel – practical experience as disjunction

Encounters with practical experience that was new and challenged previous knowledge or perceptions of theoretical, practical, ethical or personal nature moved the students into the tunnel. At the center of these experiences was always a clinical event or act. These events or acts were characterized by their importance for the student; the value that the student gave them was extensive, and the success or failure of these acts really mattered to the student. Therefore the similarities were not the practical experiences per se, but the feelings they provoked and the processes they triggered.

> Anna is a nursing student in her twenties who describes that when presented with a practical task that is relatively new to her, she experiences how feelings around this task vary from day to day. Sometimes there is no doubt in her mind that she can master this task, other days nothing works. Sometime in the middle of her education she comes into contact with insertion of the intra-venous catheter. This is a fairly prestigious task in the student community,

Table 1 . Depiction of movement into, through and out of the tunnel.

	Triggers to movement	Consequences
Moving into the tunnel	Disjunction in form of a practical experience *Anna: the insertion of the intra-venous catheter – and especially the failure to manage this task*	Imbalance, insecurity, questioning, challenge of previous held beliefs, identification of meaning and a need to learn *As the semester progresses, Anna still can't manage to insert the catheter right. She has no idea why it goes wrong and slowly this is starting to affect her thinking about her education and choice of profession. Is she really fit to be a nurse?*
Being in the liminal space – learning in the tunnel	Movement triggered by authenticity and meaning *Carin seems to 'rush through' the liminal space in one day, and feeling of insecurity and worry soon passes. One successfully performed practical task, immediately helps her to make new discoveries, and see connections that she has not been able to see earlier.*	Transformational learning processes *… and from that day Carin knows that she want to have patient contact in her future work. This knowledge also widens her perspective on the relationship between theory and practice; she now knows that she needs to see a practical application of her theoretical knowledge. Carin experiences another drive to learn and understand because she does not wish to endanger the health and care of the patients she now understands are 'at the receiving end' of her laboratory work.*
Crossing the threshold – the shift	Threshold passing triggered by a sudden or gradual understanding, a stripping away of old identity and personal transformation *The nursing student Rebecca describes how, when faced with the needs of a dying patient, she for the first time takes a more holistic view of the patient and how she automatically protects 'her patient' from too many people in the room, from unnecessary discomfort etc. She takes the lead and is able to answer questions from patient relatives and other professional groups.*	A shift in personal and/or professional identity, a discursive shift, a shift of a conceptual, ontological or epistemological nature *It has become her patient and she acts, thinks and talks like a nurse. 'I was never uncomfortable', Rebecca says, 'I thought of the patient'. The movement through the tunnel has altered Rebecca's thinking, her actions, and even her language. She feels she has become a nurse.*

something everyone talks about, and compares experiences of. For Anna, at this stage in her education, this is a core activity representing 'real' nursing actions and somehow also the competence of a nurse. But she does not get it right, and the excitement slowly changes into frustration.

The insertion of the intra-venous catheter – and especially the failure to manage this task – moves Anna into a state of liminality.

The contradiction of previous held beliefs about oneself can be a disjunction.

Carl is a medical student who perceives himself as accomplished and well equipped to handle the clinical world and the reality of a doctor. He rarely doubts himself, but at the same time he does not perceive that he crosses the lines of what he knows or is able to do, he knows his boundaries. One day when participating in an acute situation with a critically ill patient, this believe is challenged, and he is told afterwards that he has overstepped his limits. This throws Carl in to a state of reflection about his own capability and about his reactions to different situations.

Carl's experience creates a disjunction where his previous knowledge about himself is challenged, and he perceives this new knowledge as very troublesome.

When given too much responsibility and independence in a situation this can be a disjunction where ones limits are overstepped.

Helena, a medical student who enjoys a challenge and being given the responsibility to handle patient cases partly on her own, one day has to take over the responsibility of the supervising doctor. Or at least, this is her interpretation of the situation, where her examination of a patient becomes the sole basis for decisions about patient care. Helena's previous security is gone and she questions herself and things that she thought she knew.

As seen here in Helena's case, a disjunction is created by a role change, or a change in learner subjectivity brought on by her having to take more responsibility than ever before.

Being in the liminal space – learning in the tunnel

Being in the liminal space is challenging. Here the earlier well-known is no longer and previous perceived knowledge is questioned. Time spent in the liminal space varies between students, but also between different situations for the same person. One might also get stuck here in the tunnel, unable to move forward. Students oscillate between states. Feelings in the tunnel alter from day to day and there are clear 'ups and downs'. One day you might feel sure of yourself and what you are doing – the next day nothing is right. The learning process here is energy-consuming.

Anna struggles to understand why she can't get the insertion of the intra-venous catheter right.

Anna sometimes succeeds to insert the catheter and other times there is no way that she can manage. In Anna's mind this is a development phase, and she believes that the successful attempts are due to just luck. As the semester progresses, Anna still can't manage to insert the catheter right. She has no idea why it goes wrong and slowly this is starting to affect her thinking about her education and choice of profession. Is she really fit to be a nurse?

Anna spends a long time in the liminal space. Here she oscillates between different states of security, but slowly she starts to get overwhelmed.

The liminal space demands new ways of thinking and reflecting. Carl's encounter with new knowledge about himself has prompted extensive personal reflection.

Carl spends a great deal of time thinking about his role as a medical student in different kind of situation and in relation to his own competence. The whole week following the incident is perceived as hard. Carl discusses with his girlfriend, with his mentor and also in a group reflection session and spends time thinking about how to move on with the experience as something good. Carl starts to realize that his perception of himself as competent sometimes can create difficulties.

The liminal space has stripped away some of Car's old identity, and a new identity is starting to take shape.

In some cases the liminality is not so easy to discern, and the time spent in the liminal space is very brief but leads to important discoveries.

Carin is a student of medical laboratory science and as such the theoretical studies has dominated the first semesters of her education. At one point in time the day comes when she for the first time will draw blood for a venous blood sample. This is a task that has somewhat worried and puzzled Carin, she has not known how she will react. A fellow student trusts her to try her arm – even if this particular student is afraid of needles. Carin feels calm and collected, she experiences a feeling of being in control and that she is able to calm and reassure her fellow student. The venous sample is successful and from that day Carin knows that she want to have patient contact in her future work. This knowledge also

widens her perspective on the relationship between theory and practice; she now knows that she needs to see a practical application of her theoretical knowledge. Carin experiences another drive to learn and understand because she does not wish to endanger the health and care of the patients she now understands are 'at the receiving end' of her laboratory work.

Carin seems to 'rush through' the liminal space in one day, and feeling of insecurity and worry soon passes. One successfully performed practical task, immediately helps her to make new discoveries, and see connections that she has not been able to see earlier.

Crossing the threshold – the shift

Gradually, or suddenly, learning in the tunnel results in crossing of a threshold or overcoming of a disjunction. As a result there can be a shift in how the students perceive themselves as professionals, but also an identity shift. Others describe how they suddenly can understand something that earlier was impossible, or how they can view the patient and the care in another, altered way.

> After worrying for a whole semester about this catheter and becoming more and more insecure; one day, a new supervisor shows Anna in a different way how the catheter works, presenting the different parts and how they are connected, how they move etc. Suddenly Anna can see what she has been doing wrong this whole time. She understands for the first time the design of the catheter, how the different parts work together and how it must be inserted related to these different parts. Insertion becomes easy and a massive weight is removed from her shoulders. She is just as good a nursing student as everybody else, she can manage this and she no longer doubts her choice of profession.

One practical act or task has here altered Anna's whole outlook on herself, her abilities and her future professional life.

Crossing the threshold can mean new personal insights.

> Carl now is much more aware of his limits and what he can and cannot do, and he has learned that he sometimes can be interpreted as more competent or able than he is or is allowed to be. He is more aware of the impression he makes and how he is perceived by other people. Carl's image of himself is somewhat altered but foremost he has learned how he comes across to others.

Carl's time spent in the liminal space seems to irreversibly have changed not only his professional identity, but also his personal.

The shift can mean that previous unseen connections are made, and new integrated ways of thinking are opened. There can be no going back to old ways of thinking.

> Linnea is a young nursing student. One of the first days of a new clinical placement she meets a new supervisor who asks her many questions about the patient care and how for instance different laboratory tests and results are connected to patient care. Linnea has not many answers and feels stupid and insecure. She experiences a large 'gap' between herself and the supervisor. How can she ever become a nurse like that? Linnea goes home and returns the next day to the same supervisor. This day however is completely different. Linnea, to her own surprise, now can understand how specific tests are connected to how the patient feels, she can see the medical diagnosis and treatment and how there are implications fir patient care. Theory and practice has become integrated. When asked what has happened she has no answer, it just 'clicked' and that she, after being challenged, could make connections that she never been able to before and that she saw things in a new light.

Suddenly, Linnea's view of the subject landscape seems to have changed, and she has accessed a way of thinking that previously was hidden to her.

For some the shift is a professional becoming that open up a new professional world that they feel they now belong to. This shift encompasses new thinking and a sense of belonging.

> Maria is a student of occupational therapy. She has been on a longer clinical placement where she has been given the opportunity to be rather self-directed. Just before a longer holiday she has the task of transferring a patient she has been caring for to another occupational therapist. Maria tries to give as much information as possible to the new care giver, but is not encouraged and feels that her information is not appreciated. She feels that her work with the patient will be for nothing if she does not act. So; as there is a holiday coming, she knows that the patient will be without occupational treatment for a few days. On her own she visits the ward and talks to the nurses in charge and together they make a treatment plan and prioritize the patient's exercise for the days to come. It has become her patient, her plan. Her responsibility.

Through the shift, Maria has developed her professional thinking, and a new professional identity is emerging.

Crossing the threshold can also be quiet, more diffuse and first detectable after time has passed even though in keep with it' s epiphany character.

> The medical student, Magnus, has been struggling with his relationship to patients as he thinks he bothers them or takes up their time when learning. After some time he feels more comfortable being around patients, he is more relaxed and has grown into his role as a doctor where he can see that him being unsecure and hesitant is not good for the patient. Magnus has come to the conclusion that he in his role as a doctor must protect the patient, by taking on the role of the doctor. When or how this has happened Magnus is not sure of – he only knows that one day a change had occurred over a longer period of time.

Magnus has come out of the tunnel with a new professional identity, and with this identity a new feeling of responsibility for patient needs.

Some narratives revealed substantial changes to the professional identity where students acquired a professional discourse, here encompassing both thinking and language, but also a professional discourse in the sense of 'being a nurse, doctor etc'.

> The nursing student Rebecca describes how, when faced with the needs of a dying patient, she for the first time takes a more holistic view of the patient and how she automatically protects 'her patient' from too many people in the room, from unnecessary discomfort etc. She takes the lead and is able to answer questions from patient relatives and other professional groups. It has become her patient and she acts, thinks and talks like a nurse. 'I was never uncomfortable', Rebecca says, 'I thought of the patient'.

The movement through the tunnel has altered Rebecca's thinking, her actions, and even her language. She feels she has become a nurse.

Discussion

These findings illustrate how a practical experience can have the same power to transform thinking and identity as do theoretical threshold concepts, therefore making the discussion about 'practical thresholds' or thresholds in practice possible. The idea of a practical

dimension to thresholds is supported by Land and Meyer (2011) who in relation to the ontological transformations, i.e. changes in being, identity or awareness, claim that thresholds might not be strictly conceptual but also connected to procedural knowledge. These 'learning thresholds, conceptual or otherwise' (Land and Meyer 2011, 93) are occasioned by significant learning concerning shifts in identity, subjectivity and related to the ways of practice within a discipline or professional community and accompanied by a change in cognitive understanding.

Transformation of identity or professional identity according to Meyer and Land (2005) is closely linked to thinking and language. When students acquire threshold concepts they also extend their use of language, natural, formal or symbolic, in relation to these concepts – thus setting the stage for a shift in learner subjectivity, a 'repositioning' of the self' (Meyer and Land 2005, 374). The findings of this study indicate that similar transformational learning processes can be triggered by practical experience that thus can have a powerful impact on thought processes, identity and professional identity development.

The practical experience always entailed the student as the 'doer', showing that something is happening as the task or act is carried out, the action itself seems to be loaded with power to change thought and identity. Linked to the above description of students extending their language by conquering threshold concepts, one could argue that, in a similar way, when conquering a practical act or procedure, an acquisition of a 'procedural discourse' or repertoire takes place. This ownership of the procedural discourse or repertoire seems to enhance student's view of themselves as professionals. Wenger (1991) defines a community of practice through three dimensions: mutual engagement, a joint enterprise, and a shared repertoire. To sustain engagement in a community of practice you need the ability to interpret and use the repertoire of that practice. In the history of a community of practice lies embedded the artefacts, actions and language of this community, and the shaping of a professional identity lies in becoming a part of that history (Wenger 1998). Land and Meyer (2011) in their studies of surgeons and the practice of surgery, indicate that the formation of professional identity was influenced by the entrance into procedural formality, and the pattern of surgical practice, thus strengthening our idea about the importance of acquisition of a 'procedural discourse'. Land and Meyer (2011) also detects a connection between autonomy and independence and the formation of a new professional identity, which further leads us to appreciate the relevance of our findings stemming out of narratives about autonomy in clinical education.

One possible explanation to the seemingly vast power of these practical experiences could lie in the nature of clinical action or procedures as *per se* relevant and meaningful. From the student's perspective there is no questioning about why this has to be studied or learned as this is motivated by the clinical situation. Moving away from the clinical arena, practical actions and/or procedures also poses a self-evident part of the curriculum and study content motivated by perceived relevance and meaning.

Learning to master a practical situation and the challenges it poses, appears to be a significant driving-force for learning. This is supported by |Silén (2000; 2004) who in her research about independence and responsibility in learning has shown how a driving force to learn is generated from challenge. Applying variation theory (Marton and Trigwell 2000) to this line of reasoning, it would mean that the perceived relevance and meaning

originates from the variation brought on by the encounter with a new situation, act or event, thereby inducing challenge and stimulating learning.

The distribution of the forms of knowledge in catalogue, analogue and dialogue by Dahlgren and Szczepanski (1997) might also shed light on the importance of the practical, clinical act. Catalogue knowledge, according to Dahlgren, places emphasis on memorizing, analogue knowledge on understanding, and dialogue knowledge combines them both in a form of knowledge that comes in contact with world by the means of communicating. Working with a tool or an instrument can be seen as interacting or communication with the world. As our perception of the world comprises the world as whole and not as isolated parts, it would seem impossible to separate these forms of knowledge, implicating the need for learning situations in direct contact with the surrounding, authentic situation (Dahlgren and Szczepanski 1997). This ties in with the pragmatic core idea that human beings act in the world, and that knowledge is created in action (Dewey 1911). Also Merleau-Ponty (1945/1962) emphasizes the impossible in separating body and mind, describing how we before we can experience 'I think' rather experience 'I can', meaning that the world has a meaning to us even before our interpretation of it (Skott, 2004).

A clinical situation constitutes an automatic whole where the inherent parts, the performed task, is given meaning and relevance by the situation itself, i.e. the patient and patient needs. As such the situation poses a clear relevance structure. Every situation, be it a learning situation or a situation where we apply something learned, has a certain relevance structure (Marton and Booth 1997). This relevance structure consists of what the person perceives of the situation, the demands of the situation, the goals of the situation etc. The situation perceived as a whole will provide perspective on the inherent parts. Research has shown that the learning situation's relevance structure is closely linked to the general quality of knowledge and skills, and that perceived relevance will provide a more successful learning outcome (Marton and Booth 1997). Authentic experiences are connected to the perceived relevance, and the thereby created relevance structure. These findings show how the movement through the tunnel is triggered by the perceived meaning of the authentic clinical experience. The relationship with the patient and the need to master tasks relevant to the patient constitutes the internal authenticity that drives the student through the tunnel creating transformational learning processes.

What constitutes the shift however? The findings show how transformational learning is created through authentic clinical experience, but we have not been able to fully see what constitutes the shift itself, other than maybe time where there have been longer processes involved. In narratives where the focus is more clearly on an isolated act in the practical experience, feedback might play a role, here seen in the immediate 'bodily' feedback when performing a task correctly. Therefore research on processes within the tunnel is of utter importance to further understand passing of thresholds in relation to practical experience.

In conclusion; there are likely many elements at play here that influence the impact of the practical experience on transformational learning, and undoubtedly is further research of utter importance. However, this paper could be read as an attempt to infuse the discussion about threshold concepts with the idea that actions could have similar influence on learning that theoretical threshold concepts.

Limitations

This paper should be read as an attempt to broaden the discussion about threshold concepts, putting forward the idea that practical experience could manifest itself in the same way as a conquered theoretical threshold concept. However, the small scale of the study and the novelty of this interpretation would suggest that extensive further research is needed in order to investigate the practical dimension of threshold concepts. This line of research could, when further explored, have a substantial impact on the design of clinical studies. By understanding more about learning processes in clinical learning, we can adapt and develop prerequisites for these processes. In health care today with limited resources, and yet an increasing number of health care students, a knowledge of how to work with processes already 'at hand' in the clinical setting becomes vital.

Critique about the threshold concepts framework has been put forward by Rowbottom (2007) who addresses the lack of clarity about how threshold concepts are defined and that it without such a definition is impossible to empirically isolate concepts. Rowbottom (2007) also addresses that problem of deciding that one concept is a threshold concept for all students, and argues that there might be different conceptual routes to the same goal or ability. Here, this critique is interpreted as a constructivist argument against the idea of a fixed set of ways of interpreting a concept. Savin-Baden (2008) argues for the use of 'disjunctive spaces' as a response to the risk of overgeneralization of threshold concepts, stripping away context and the individuals' stance as a learner. These disjunctions are the same, and what constitutes 'troublesome knowledge' will vary between people, taking into account that situations and knowledge will vary. Seen against the back-drop of this critique, we would argue that we indeed have tried to empirically identify threshold concepts, but with a starting point in the individual experience where threshold concepts or are seen and interpreted in the light of the situation, and previous experience and knowledge. Indeed, Meyer and Land (2005) point out the problem of objectivism, i.e. ideas about a definitive and total conceptual understanding – a 'right' answer in contradiction to their view of threshold concepts as discursive in nature.

Another difficulty lies in the interpretation of 'practical experience'. Noted should be, that even in the more complex situations, emphasis was on action and the student as the performer of this action. However, as isolated events or action never can be separated from the context in which they are performed – or indeed a phenomenon never can be isolated from the contexts in which it is perceived – the interpretation must remain with 'practical experience'.

Notable is also that this is the second study with the same data as subject for analysis, but even if data is the same, the questions posed to the material and the theories used to interpret findings provide a new perspective and bodes for robustness of findings.

Disclosure statement

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