

Experience, trajectories, and reifications: an emerging framework of practice-based learning in healthcare workplaces

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Abstract Learning by working is omnipresent in healthcare education. It enables people to learn how to perform, think, and interact in ways that work for their specific context. In this paper, I review my approach to studying this process. It centers on the question why healthcare professionals do what they do and how their actions and learning are intertwined. The aim of this paper is to illustrate what I have learned from the research I have been involved in, in such a way that it enables other researchers, educators, and clinicians to understand and study practice-based learning in healthcare workplaces. Therefore, I build on a programmatic line of research to present a framework of practice-based learning consisting of three inextricably linked levels of analysis. The first level focuses on how situations lead to personal experiences, the second level looks at strings of experiences that lead to multiple trajectories, and the third level deals with reifications arising from recurrent activities. This framework, and its interrelations and inherent tensions, helps to understand why healthcare workplaces can be both a powerful learning environment and a frustratingly hard place to change.

Keywords Learning framework · Personal experiences · Practice-based learning · Programmatic research · Reifications · Trajectories · Workplace learning

Introduction

The greatest strength of learning from practice is that it enables people to learn how to perform, think, and interact in ways that work for their specific context. At the same time, the highly contextual nature of learning from practice makes it a challenging educational environment. The mix of work *and* education combined with the goals of developing both

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ability for the present *and* capability for the future makes practice-based learning a fascinating research area. Over the past 9 years I have been studying the process of learning in healthcare workplaces. My research was, and still is, based on the assumption that both patient care and education benefit from a solid understanding of practice-based learning in our field (Teunissen 2009; Bok and Teunissen 2013). Two consistent conclusions that I see emerging from my work and that of colleagues are that learning is an inevitable result of acting, and that maintaining or improving performance requires learning. In other words, learning and acting (engaging in practice) are part of the same process (Dornan et al. 2007; Watling et al. 2012). My understanding of and approach to researching the interface between acting and learning have substantially evolved over the course of my research. The ‘I wish I knew then...’ section in this journal provides an opportunity to look back on my program of research and weave the findings into “a coherent bigger picture” that reflects where I have come to, and where I see this field of research moving in the future (cf. Regehr 2007). Since my research has been the result of collaborative efforts with varying teams, I will refer to work that I participated in or led using plural pronouns.

In this paper I describe an approach to the study of practice-based learning in healthcare. Findings from research projects that I have collaborated on serve to illustrate three levels of analysis that have crystallized over the years. My aim in presenting these levels is to provide a framework, called the experiences-trajectories-reifications (ETR) framework, which may help other researchers understand how they can approach their topic of interest and how their findings may connect to existing literature. Moreover, the ETR framework is a systems approach to help researchers, educators, and clinicians understand some of the distinctive features of acting and learning in healthcare workplaces. The first level of the framework focuses on how situations lead to personal experiences, the second level looks at strings of experiences that lead to multiple trajectories, and the third level deals with recurrent activities that result in social and cultural reifications. These three levels are interconnected. When one becomes the focus of analysis the others necessarily move to the background. I will suggest, however, that because of their interconnections, it is valuable to keep all three in mind even when foregrounding one. In explaining each of the three levels I will highlight their interconnections and illuminate how they work together to form a self-sustaining process. In doing so, I am hoping to demonstrate how individuals’ idiosyncratic experiences of practice and their resultant idiosyncratic trajectories can go hand in hand with the commonalities that can be seen across individuals’ behaviours and approaches within a profession, as well as the stability in healthcare practices across time. After introducing the ETR framework, I briefly review three tensions that recur across all levels of analysis. I end with discussing potential applications of the framework by reviewing recent publications on workplace learning in undergraduate medical education.

Learning, learners, and labels

Before explaining each level of analysis, I should clarify what I mean when I use the words ‘learners’ and ‘learning’. A consequence of conceptualizing both learning and acting as part of the same process is that I consider all those who participate in healthcare, including patients, to be learners. While some, such as nursing students or residents, are explicitly labelled as learners, others are not. Labels and their accompanying expectations regarding roles and responsibilities influence how people participate and learn, but it doesn’t change that they are engaged, act, and learn. I see learning as an individual, situated, and social process of constructing meaning. Sometimes learning is evident because it results in

observable changes in future behaviour, but often learning means reinforcing or only slightly adjusting knowledge or behaviour. By implication, much learning is difficult to recognize, objectify, or trace back to its sources. This complicates education in the form of practice-based learning because educational systems rely on assessing predefined observable changes in individual learners to infer their efficacy. Most non-formal and tacit learning remains unrecognized because it cannot be operationalized as observed change (Eraut 2004). Such learning, however, can have a significant impact on individuals' behaviour (Doornbos et al. 2004). The ETR framework doesn't qualify a learning process based on the presence or absence of observable changes in individuals' behaviour. Instead it aims to provide an understanding of how individual, situated, and social aspects connect to give rise to a diversity of individual and collective effects that constitutes acting and learning at workplaces.

Level 1: Situations lead to experiences

“Well if they didn't do any deliveries then they watch someone else do one, but at some moment they're going to manage that delivery themselves and from that perspective they learn by doing as they go along. The realistic impression of things is that they are learning while working” (Teunissen et al. 2007a).

This quotation from an obstetrician in an early study we performed on how residents learn nicely illustrates that doctors in training learn by doing their work. Similar quotations can be found in other qualitative research looking at the interaction between acting and learning in healthcare workplaces (Watling et al. 2012; Sargeant et al. 2011) In research, one can artificially freeze aspects of the on-going sequence of activities at the workplace and focus on specific situations to help understand how different learners construct personal experiences. Using such methods, I have come to recognize three driving forces that seem to underlie how an individual acts and learns in a specific situation: first mimicking; second, making sense of what is happening; and third, combining previous experiences to devise new approaches to a problem. Together these processes enable behaviour that range from simply mimicking others to developing creative solutions (Sawyer 2012). Descriptions and characteristics of these basic processes can be found, for instance, in texts on historic and present master-apprentice relationships (Billett 2010; Lingard et al. 2002), in neuroscience research on cognitive architecture (Meltzoff and Decety 2003), and in social psychological research on priming (Dijksterhuis and Bargh 2001).

For example, two studies we conducted on how residents learn, one from the perspective of residents and the other from the perspective of consultants, partly addressed the importance of mimicking, although we had not yet recognized that issue as such, as well as making sense of what is happening (Teunissen et al. 2007a, b). These studies showed that through participation learners encounter a repertoire of acts they can try out for themselves, sometimes after modification (e.g. communication approaches, treatments, movements during procedures), which either 'work' or don't (Teunissen et al. 2007a, b). These acts often involve social interaction and are always set within a social and cultural system. The specific context of that situation, as well as the extent to which their acts are perceived to 'work', give a learner access to explicit and inferred information that can help to make sense of what led to this point, what is going on now, and how things might evolve. For instance, the single act of a resident placing a suture on a bleeding vessel during surgery gives access to explicit information on her surgical technique by observing if the bleeding

stops, remains, or increases. In addition, the sigh of her supervising consultant or the raised eyebrow of the assisting nurse can be construed by this resident (rightly or wrongly) as information relevant to her performance. Anyone involved in any situation consciously and unconsciously uses bits of information they perceive to be relevant to make sense of what is happening and to help them adjust their behaviour. In doing so a situation is transformed into a *personal experience* (Teunissen and Wilkinson 2010).

Another line of inquiry in which I have been involved examined learners' sense making. Specifically, we explored the role of feedback inquiry and feedback monitoring in this process. Using a quantitative approach, we shed some light on how situational (attending physicians' supervisory style) and personal factors (goal orientations) influenced a resident's personal interpretation of the benefits and costs of feedback-seeking in relation to night shifts, and how these personal interpretations influenced behaviour (Teunissen et al. 2009b). Using a qualitative methodology, we also studied a group of veterinary students, exploring how and why students looked for performance related information (Bok et al. 2013). This paper described interactions between personal factors, such as a person's intentions (desire to learn or making a good impression on the feedback giver), the willingness and quality of the feedback giver, and the relationship between the two. This led to a situationally bound assessment of the potential costs and merits of getting feedback, which in turn influenced the timing, topic, source, and method of feedback-seeking. A study on the level of active engagement in formative assessment by trainees and supervisors, added the credibility of feedback to the list of influences and also found that supportiveness of the learning environment was important for feedback facilitation (Dijksterhuis et al. 2013). These findings are corroborated by what other researchers have found (Sargeant et al. 2005, 2011; Watling et al. 2012).

A third area of research on which I have collaborated at this level focused on how acts, and the evolving understanding resulting from them, can guide and support learners in devising approaches to current and anticipated challenges. This ranges from very concrete solutions, such as organizing the healthcare logistics for an outpatient or dealing with old intra-abdominal adhesions during a laparotomy, to more abstract resolutions. A quotation on differences in communication style from a study in which we interviewed general practice students illustrates how participation in care provided one student with different communication approaches to reflect on (van der Zwet et al. 2011):

“Because I could observe two doctors, and one is really like, (...) he is really very open you know, there isn't much distance. And the other is somehow, yes he is, he is more businesslike, more aloof. (...) And then you see, well yes, how I would want to be in the future (...) for you also see how patients respond, and also how you can get the most out of a conversation.”

The way in which previous experiences contribute to tackling present challenges can be a conscious, deliberate process. But psychological literature, such as that on expertise, indicates how important the stream of unconscious processing is in the decisions that we continuously make and the acts that follow (Kahneman and Klein 2009). In a study that used priming as a method, we explored this by looking at how previous experiences in the form of associations affected residents' approach to a difficult clinical decision-making task (Teunissen et al. 2009a). By using contextual cues to unconsciously activate relevant associations, this study illustrated that there are interactions between past experiences and current actions that learners are not aware of. In this example, junior residents' treatment

decisions were influenced by an irrelevant word game presented just before they were asked to review a clinical vignette. Senior residents' increased experience appeared to prevent this biasing influence of irrelevant contextual cues (Teunissen et al. 2009a).

Through the use of studies that isolate or "freeze" a particular moment of learning, as described in this section, we have been able to focus on how situations are turned into personal experiences. This has allowed me not only to explore these processes, but also to begin to understand how experiences can significantly vary between different persons participating in the same situation. In addition, I have come to understand that research on the processes that influence learners' behaviour, their construal, and the significance of their experiences for their future participation in practice, benefits from multiple research approaches. Many cognitive, distributed, and sociocultural theoretical perspectives deal with 'experiences' in different, sometimes complementary, ways and allow for a variety of methodological approaches (Yardley et al. 2012; Pimmer et al. 2013; Mann et al. 2010). However, better understanding the learning process also requires insight into the two other levels of the ETR framework.

Level 2: Strings of experiences lead to multiple trajectories

Each day at work is a succession of situations in somewhat different circumstances with varying actors, objectives, and outcomes, leading to a succession of personal experiences. Over time, personal experiences can (re)combine to make up strings of significant events forming trajectories. Trajectories can be defined as combinations of personal experiences over time that result in personal development and impact the constant renegotiating of our identity (Eraut 2004; Wenger 2010). Each individual is engaged in multiple intertwined trajectories and any social interaction can be seen as a junction in the multiple intertwined trajectories that each individual represents and, to a greater or lesser extent, shares with other actors. As a result, our epistemologies are personal and shared at the same time. The experiences that result from a situation may differ in relation to one's trajectory. Trajectories can be professional and/or private and they can be small, such as 'becoming proficient with a new surgical procedure', or large, for instance 'becoming a doctor'. Trajectories can be the result of agency, of deciding to pursue development into the role and identity of, for instance, a surgeon, nurse, or physiotherapist. But trajectories do not need to be planned out in advance; they can also become clear in hindsight or may always remain tacit. Some experiences will have more impact than others and people will remember only a selection of events when asked to reconstruct the trajectories they have traversed (Malle 2004).

In a qualitative study with undergraduate medical students in general practice, we used the term 'developmental space' to describe the "explicit and implicit opportunities for identity development that are afforded to and created by students" (van der Zwet et al. 2011). As explained in that paper "the 'available space' [for identity development] that emerged from the data consisted of interconnected components and processes contributing to personal growth. Personal growth transcends the acquisition and application of knowledge, skills and attitudes required for a specific clerkship or by a specific physician and relates to the development of a student's professional identity" (van der Zwet et al. 2011). In postgraduate medical education, we looked at the assessment of competence and the corresponding independence that is granted to a resident (Dijksterhuis et al. 2009). This work illustrates how trajectories lead to developments that allow new or other ways of

participation. It also shows the complexity of negotiating clinical independence and exemplifies that trajectories are not clear-cut paths (Dijksterhuis et al. 2009).

Transitions provide an interesting opportunity to study shifts in trajectories and ‘new’ starting points because they highlight whether and how one’s current abilities and identity align with the challenges presented by the transitional phase (Teunissen and Westerman 2011). This often involves a “fundamental re-examination of who and what we are, even if this processing is occurring at a largely unconscious level” (Wilkie and Raffaelli 2005). In a research project headed by Westerman we looked at the trajectories of physicians who were taking a position as a consultant for the first time (Westerman et al. 2010). Becoming a new consultant often coincided with moving and settling in a new life as a family. This affected the trajectory of developing into the role of a consultant. Moreover, new roles, tasks, and contexts led to experiences that differed significantly from what these physicians were used to, stimulating practice-based learning to deal with these challenges (Westerman et al. 2010).

The concept of trajectories features strongly in the work of scholars in the field of vocational learning. For instance Eraut and Hirsch used the term ‘learning trajectories’ to denote “progress in a person’s performance” (Eraut and Hirsch 2010). Wenger explained his notion of ‘trajectories’ as a continuous motion “that connects the past, present, and the future” and as representing our constant renegotiation of identities within and across communities of practice (Wenger 2010). As he eloquently stated “we are always simultaneously dealing with specific situations, participating in the histories of certain practices, and involved in becoming certain persons” (Wenger 2010). Wenger also explained that the history of members of a community of practice “provides a set of models for negotiating trajectories” that is an important “factor shaping the learning of newcomers” (Wenger 2010).

Understanding the significance and impact of trajectories requires a specific focus on how and why experiences link together. To this end, I have found that research with longitudinal aspects is particularly helpful in unearthing these issues. It allows one to study not only how trajectories link personal experiences, but also how individuals’ trajectories affect the ways in which situations are converted into different personal experiences, potentially leading to increasingly divergent individual trajectories. This was nicely illustrated by a study where we followed how new consultants developed into their role of on-call supervisor. We showed that similar uncertainties about how to supervise residents can lead to very different learning outcomes for consultants based on their previous experiences, perceived support from colleagues, and current interactions with the supervised residents (Westerman et al. 2013a). The third level of the ETR framework builds on these concepts to understand how confluences of trajectories replicate, reinforce, and thereby reify the practice of healthcare in a particular context.

Level 3: Recurrent activities result in social and cultural reifications

Coming back to both Eraut and Wenger’s notion of trajectories, they both, in different ways, take individuals to be the unifying factor in their conceptualisation of trajectories. I agree, but think there is a second conceptualisation of trajectories that can help understand practice-based learning. It requires looking at trajectories not from the standpoint of individuals on multiple paths of development, but from the standpoint of a practice that both shapes and is being shaped by recurrent patterns of activities. These recurrent patterns

of activities gradually reify, or make a concrete reality, of things such as opportunities, expectations, norms, and values. For instance, the weekly rhythm of an internal medicine department dictates that there will be a number of residents who look after the in-patients, supervised by a consultant. Some days will be reserved for grand rounds and others for teaching sessions. The residents will see all patients in the morning together with a nurse. Nurses' schedules are different and include waking patients, taking their vitals, and conducting a concise history in preparation for rounds. The activities of nurses, residents, consultants, and patients are tightly interwoven, regardless of the individuals who are enacting that work. Although there is some room for negotiation, for example starting rounds later because nurses are understaffed and need more time to see all the patients, recurrent patterns of activities show limited variations. The re-enactment of certain activities throughout the history of a practice leads to common trajectories that reflect its opportunities and boundaries in the same way as international shipping routes traverse the waters to delineate coasts, unfavourable weather systems, and mark canals. The third level of analysis concerns precipitations of these processes. This is a vital part of the ETR framework because it provides a way of understanding why learners do what they do and what they could learn.

Since many aspects of experiences and trajectories are shared between individuals and within groups, conventions develop, hierarchies are established, specific tools are invented, and people get to know 'the way we do things over here'. Recurrent patterns of activities can, over time, give rise to a shared and negotiated system of socially and culturally meaningful structures (Lassiter 2008). These social and cultural structures are reified in the organization of standard processes, guidelines, protocols, tools, software, schedules, expectations, restrictions, language, and many other precipitations of recurrent activities. As a result, healthcare workplaces are relatively stable environments that tend to resist change; not necessarily because of individual resistance but because of a practice's long-standing tradition of having similar groups of people involved in similar tasks with similar goals, i.e. nurses, doctors, and allied healthcare professionals caring for patients. Changes that do happen, arise because, for intentional or serendipitous reasons, people start acting differently. Sometimes it starts with "initially incidental features [that] may in the course of cultural change become newly critical ones" (Lemke 1994).

A study led by Van der Zwet with pairs of general practice preceptors and their medical students during a 10-week rotation highlighted recurrent patterns common to all preceptor-student pairs (van der Zwet et al. 2014). Their interconnected, albeit different trajectories started with establishing points of departure, moved towards searching for dialogue which allowed preceptors to share with students what they saw as enacting good medical practice, and then turned towards closure of the relationship at the end of the rotation (van der Zwet et al. 2014). This illustrated that although the actors and contexts may be somewhat different, medical practice can make certain types of interaction more likely than others. Not just in general practice training, but in all instances of healthcare, people re-create the environments in which they work and learn, and shape what opportunities there are for change.

Boor led a number of studies on the topic of learning environments, or 'learning climates' as she called it (Boor et al. 2008, 2011). That research focused on trying to understand the concept of, and possibly measure variance between, learning climates. We concluded that a learning climate reflects a practice's approaches to participation that incorporates shared perceptions of themes like "atmosphere, supervision, learners' status, and relationships between team members". It is "shaped by organizational arrangements and artifacts", and it "becomes manifest in the daily practice and activities in which learners participate" (Boor 2009). This social and cultural history that sets the scene for

learning can be hard to change. In an attempt to understand program directors' role in modernizing specialty training, we explored how they viewed the medical educational system and how they tried to influence it (Fokkema et al. 2012). Program directors appeared to have different, largely implicit, strategies to motivate their colleagues to change but, as was confirmed in a subsequent study, a match between the intended changes and current social and cultural structures were a key factor in adopting new ways of teaching and assessment (Fokkema et al. 2013).

Social and cultural structures embedded in practice directly impact acting and learning by enabling or restricting the situations people can participate in and by framing personal experiences. Examples can be found in many instances. For instance, I collaborated with Susan Wearne on a review of general practitioners' role as supervisors in postgraduate medical education (Wearne et al. 2012). That paper is not just an explanation of what effective general practice (GP) supervisors should do. It also showed what social and cultural expectations have become ingrained in the current system of postgraduate general practice education (Wearne et al. 2012). In the research headed by Jonne van der Zwet on GP supervisors in an undergraduate setting we showed that differences between cultures, in this case general practice as opposed to clinical care, are even used by supervisors to "privilege certain practical, social, and professional activities or values" (van der Zwet et al. 2014). In a comparative study between Denmark and the Netherlands, we looked at social and cultural variations between these two countries to explain the finding that new Danish consultants perceived their transition into a first position as consultant to be less intensive, and reported less burnout than their Dutch counterparts (Westerman et al. 2013b). My participation in these studies, and the gradual conceptualisation of the ETR framework, has taught me how omnipresent social and cultural reifications are. The fact that I, and many other researchers of education in health professions are fully immersed in their field of research may, however, make it more difficult to see what is still obvious to more naive outside observers of our field (Albert et al. 2007). Moreover, research methods developed outside the biomedical scientific tradition, such as those grounded in sociology and anthropology, seem particularly suited to study how people re-enact cultural and historical features of a practice over time.

The influence of social and cultural structures on the nature of the situations people participate in and their impact on how situations are transformed into personal experiences is the link that closes the perpetual loop of the ETR framework. As Barker (p. 239) states: "in and through their activities, agents reproduce the conditions that make those activities possible" (Barker 2012). The circularity of causes and consequences inherent in the ETR framework helps to understand the complex nature of acting and learning in healthcare workplaces. It also explains why seemingly opposite characteristics, such as the idiosyncrasies and communalities of practitioners and the practice they work in, are joined in the system they constitute. Just as in a variety of other human processes, the continuous 'push and pull' that different tensions produce probably adds to stability of the entire system (Ingber 2003a, b). In the following sections I briefly introduce three tensions that feature across all three levels and that I consider to have a strong impact on acting and learning in healthcare workplaces.

Tensions across levels

Stability versus change

From the individual up to teams and entire healthcare systems, all appear to strive for some degree of stability. For individuals and teams, predictability is an important prerequisite for

perceiving stability. Knowing what to expect diminishes stress and increases a sense of efficacy (Ulrich-Lai and Herman 2009; Bandura 2011). At the same time working in healthcare evolves due to patients' demands, technological advances and financial pressures. Moreover, many people feel an urge to continue learning and developing (Teunissen and Dornan 2008). As a result, workplaces are in a constant state of flux resulting from smaller and larger changes that fuel a perpetual search for new equilibriums. This tension affects all levels of analysis in the ETR framework, from individual development to social and cultural change.

Structure versus agency

The tension of stability versus change relates to another issue; that of (perceived) control over one's own actions and circumstances. In sociological literature this topic is debated as structure versus agency. Structure entails the sociocultural systems and recurrent practices that determine our choices and opportunities to act and learn (Barker 2012). Agency is our ability to make free choices, although this does not mean free in the sense of 'not determined'. As Barker explains, agency is a "socially constructed capacity to act" (Barker 2012). Agency and the extent of free choice are also part of an ongoing discussion within the psychological and neurocognitive literature. There is compelling evidence to support the notion that "most of a person's everyday life is determined not by their conscious intentions and deliberate choices but by mental processes that are put into motion by features of the environment and that operate outside of conscious awareness and guidance" (Bargh and Chartrand 1999). The illusion of undetermined, free choice probably impacts many self-report and interview studies in our domain and skews our understanding of learning to emphasize individuals' actions. Be that as it may, the tension of agency versus structure is receiving increasing attention in medical education literature, for instance in how residents and consultants deal with the requirement to use work-place based assessment formats (Fokkema et al. 2013).

Inside versus outside anchors

All three levels of analysis involve relative judgements, for instance regarding questions like 'How are we doing?', 'Is this acceptable behaviour?', 'What does good medical care mean in this instance?'. These relative judgements are important because they impact what people do and learn. Relative judgements involve some sort of comparison, an anchor that is used to compare against. A recurrent tension in this respect is whether someone or a group of people look more towards themselves or towards others for anchors. In cultural research this is the distinction between individualism and collectivism. In collectivist cultures "people are interdependent with their in-groups, give priority to the goals of their in-groups, shape their behaviour primarily on the basis of in-group norms, and behave in a communal way" (Triandis and Suh 2002). Individualism represents the opposite pole of the spectrum. The corresponding continuum at the individual level of analysis ranges from idiocentrism to allocentrism (Triandis and Suh 2002). Although research on how individual dispositions play out in different cultures is not conclusive, consistent findings on either the cultural or individual ends of these two concepts show their impact on a variety of outcomes relevant to acting and learning in healthcare workplaces. These range from mode of participation in the workplace, to approaches to dealing with errors, to the organization and public expenditure on healthcare (Klimidis et al. 1997; Bell 2007; Gelfand et al. 2011; Castilla 2004).

Applying the ETR framework to research findings in undergraduate workplace learning

One of my aspirations in presenting the ETR framework is to help research and practice in the field of practice-based learning in healthcare move forward. To illustrate how it may help frame the outcomes of current research on workplace learning in healthcare workplaces I review three recent publications in the area of undergraduate learning.

Late 2013 and early 2014 three different research groups published three papers from different geographical contexts, all looking at medical students' workplace learning in undergraduate training programs (Smith et al. 2013; Steven et al. 2014; Karani et al. 2014). In their focus group study on a new way for students to participate in real patient care through 'pre-prescribing', Smith and colleagues stressed the importance of professional identity formation through participation in practice. From the perspective of the ETR framework, they explained how opportunities for active participation contributed to students' trajectories. While students' learning trajectories were the main level of analysis in this paper, they also explained how, at the level of personal experiences, making mistakes "affected all developmental outcomes in this study" and how, at the reifications level, hierarchies and limitations traditionally attached to the role of students affected students' development (Smith et al. 2013). Steven and colleagues longitudinal and multi-method qualitative research on "how undergraduate medical students learn from real patients in practice settings" confirmed the basic assumption underlying the ETR framework; learning and acting are part of the same process (Steven et al. 2014). This study illustrated how three different types of activities, "education without patient care, education within patient care, and patient care without education", provided the social and cultural context for different kinds of personal experiences. Furthermore, they discussed the importance of discourse within each of these activities to open up or close off possibilities for students' trajectories of engagement (Steven et al. 2014). Karani et al. 2014 used focus groups to study what medical students learned from residents and "which teaching strategies are used by the best resident teachers". Most of their findings comfortably fit within the first level of analysis of the ETR framework, showing how residents could increase the educational value of activities by creating situations that were conducive to constructive personal experiences.

My intention in explaining how the ETR framework can be instrumental in connecting the very different findings of these three studies is not to create one homogenous explanation of practice-based learning. On the contrary, I believe it serves to illustrate how the ETR framework may offer researchers, as well as educators and clinicians, a common language for discussing the interesting heterogeneity of approaches, empirical and personal findings, and suggestions for improvement. I did not embark on my line of research with the ETR framework in mind, but rather different aspects of the framework emerged from individual projects. They often overlapped and gradually deepened my understanding of each different level and their interconnections. My interest in studying practice-based learning started with research for a PhD thesis while I was a recently graduated medical doctor. The past five and a half years I have conducted research while also being a medical specialist trainee. I feel my way of approaching practice-based learning, resulting in the ETR framework, is the result of engaging in a variety of research projects that helped to develop concepts grounded in academic theories but also connected to actual practice. Over the years these concepts changed. Looking back at, for instance, the 2007 study on how residents learn, I now see how the ETR framework could have provided the concepts

and language to highlight the system of practice and learning that residents are a part of Teunissen et al. (2007a).

Several limitations apply when considering the conceptualization of practice-based learning put forward in this paper. First, the core of my research has focused on undergraduate and postgraduate medical education. As a result, research from the domain of continuing medical education, nursing, or other allied health professions might not fit comfortably within the ETR framework. This framework is a result of my attempt to bridge the cognitive-sociocultural epistemological divide. I believe that is important because many of the pressing issues that we face cannot be fully understood from either perspective alone (Billett 1996; Mason 2007). I realize, however, that this does not require a framework that brings both perspectives together in a unified concept. One of the strengths of the ETR framework is its gradual development based on a programmatic line of research. The main question underlying that research program was ‘why do healthcare professionals do what they do?’ This led to my involvement in a variety of research collaborations with a range of qualitative and quantitative research methodologies, including some very informative longitudinal approaches (Westerman et al. 2013a; van der Zwet et al. 2014). I believe this diversity is the greatest strength of the conceptualization of learning in healthcare workplaces that I have presented. The explanatory strength of any conceptualization lies in its application, so future research will have to prove the usefulness of the ETR framework and hopefully lead to further developments in understanding practice-based learning.

Conclusion

Healthcare workplaces allow people to learn, improve, become experts, and collaboratively help others in their times of need. There is, however, another side to working in healthcare that leads to a significant amount of burnout, disillusionment, and feelings of disempowerment. This paper deals with the interface of acting and learning in this context to explain why it can be both a powerful learning environment and a frustratingly hard place to change. I have presented a framework of practice-based learning consisting of three inextricably linked levels of analysis. The first level focuses on how situations lead to personal experiences, the second level looks at strings of experiences that lead to multiple trajectories, and the third level deals with the reifications arising from recurrent activities. Future research can help to refine the framework and its inherent relationships and tensions.

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