

This chapter demonstrates how Decoding work can be productively utilized within a curriculum change process to help make design decisions based on a more nuanced understanding of student learning, and the relationship of a professional program to the field.

Impact of Decoding Work within a Professional Program

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Introduction

The Athletic Therapy (AT) group at Mount Royal University is currently engaged in a large-scale pedagogical and curricular change, moving to a competency-based approach using a clinical presentation model. This approach “uses a scenario or a clinical case as a foundation to both teach and measure a student’s knowledge, skill, or ability” (Lafave, Westbrook, Valdez, Eubank, McAllister, and Yeo, in press). There have been various components to this process, including the content validation of the clinical presentations (Lafave et al., in press) and a qualitative self-study on the curricular change process among its faculty members, which led to the development of a community of practice within the team. The community of practice that developed “was key to the curricular change process, despite it being often focused on other elements beyond curriculum, specifically, on the practice and identity of the faculty members as athletic therapists” (Yeo, Lafave, Westbrook, McAllister, Valdez, and Eubank, manuscript under review).

Michelle Yeo, a faculty developer working with the AT team, introduced the “Decoding the Disciplines interview” as another vehicle to delve more deeply into the team’s approaches to the curriculum. All members of the team were quite intrigued by the concept and agreed it would serve the self-study process well. As described in Chapter 1 of this issue, Decoding the

Disciplines, pioneered by David Pace and Joan Middendorf, is a process whereby instructors first identify bottlenecks, or “points in a course where the learning of a significant number of students is interrupted” (Anderson 1996 cited by Middendorf and Pace 2004, 4). The next step is for the instructors to engage in a Decoding interview, where two trained interviewers probe to assist the instructor in first clarifying the bottleneck and second, to “reconstruct the steps they themselves do when solving similar problems” (Middendorf and Pace 2012, 5). AT team members each chose a different bottleneck related to their particular courses and experiences with students. As a group, classroom based, field based, and integrative bottlenecks were all represented, but this was not pre-determined. Michelle Yeo and Ron MacDonald, two members of the Faculty Learning Community on Decoding the Disciplines at Mount Royal University (see Boman, Currie, MacDonald, Miller-Young, Yeo and Zettel, this issue), acted as interviewers for the five members of the AT team, and the interviews were recorded and transcribed. The interviews were conducted as a component of self-study by the AT team, with the interviewees acting as co-researchers, reading and coding the interviews. This process yielded deeper insights than by simply participating in and reflecting on an individual interview. Indeed, the AT team found that the biggest impact came from reading and reflecting upon one another’s interviews making this group practice something to consider for the Decoding process more generally.

The transcripts of these interviews reveal thematic support of the framework outlined by Miller-Young and Boman in Chapter 2 of this issue, eliciting similar ways of thinking, ways of practicing, and ways of being. While the Miller-Young and Boman interviews were conducted across a variety of disciplines, these were concentrated with a group of Athletic Therapists, and thus the results are compelling to consider in this intra-disciplinary context. While the above

themes were present within the Athletic Therapy interviews, additional facets were also evident, which are explored below.

Important insights emerged relating directly to individual classroom practice within the context of the curriculum change in spite of some of the interviewees feeling frustrated at the time of and immediately following the interview. Some overarching insights related to program design, delivery, and structure. While all of these themes were present to greater or lesser extents across the interviews, each came forward most dramatically in specific cases, and thus within each theme we will focus most closely on one or two particular interviews. These themes are described as: 1) lifting the veil (or, when the problem is not the problem); 2) the emotional component of learning; 3) unpacking professional intuition in Athletic Therapy; and finally, 4) disrupting practice in the field. All of these together carry implications for program and curriculum design, and thus, in sum, the chapter offers a practical example of how Decoding work can be used within an academic program to impact program design and delivery.

For the purposes of this chapter, pseudonyms have been given to the interviewees, who were all members of the AT team. All participants are also co-researchers. All are experienced Athletic Therapists, and they have taught in the Athletic Therapy program for a range of 6 – 21 years.

Lifting the veil (or when the problem is not the problem)

This theme was particularly prevalent in Julie's interview. Julie chose an apparently straightforward cognitive bottleneck where students had difficulty remembering and being able to identify discs in the spinal column in relation to vertebrae. She initially describes the bottleneck this way:

There is an anatomical relationship between the nerve roots leaving the back and the disc that would push on it, and students have difficulty in identifying which disc is the one that would actually have the problem. So they can identify what the symptoms are and where it is affected, but they can't identify the cause, the specific location of the cause.

She then goes on to explain the nature of the confusion:

Throughout the regions of the spine, you have the cervical spine, the thoracic spine and your lumbar spine, and because the size of the vertebra is different in each part of the spine so are the discs and your spinal cord changes... and so that changes the relationship as well. That is the part that is confusing to people, you can't just say "Oh I have a C5 nerve root symptom, so therefore it is my C5 disc," and in fact it is not that in most cases... that is where people are having the problem.

Interviewer: And what do you do to figure out the next step?

Then you go back to your anatomy to understand where does a nerve root exit relative to that disc and vertebra? Like where does it exit the spine? And ... relative to what disc?... it is more complicated in the lumbar spine because the discs are big and there could be more than one nerve root that is compressed, but it is the weird relationship between where nerve roots exit and disc herniations happen that makes it confusing.

Through the process of the interview, Julie drew the anatomy of the spine and discs on the white board. It was puzzling to the interviewers because the concept itself seemed relatively simple even for disciplinary novices. A key component to understanding the bottleneck emerged as the importance of "drawing it out." While perhaps tricky to visualize when explained verbally, and certainly Julie uses Powerpoint slides with diagrams as part of her lectures, what came

forward was the difference she noted between students who “drew it out” on the margins of their exams when tested on the concept and those that do not:

I have tried to give them, “Here is how you draw it out for yourself.” You can see, and that is interesting to me... I tend to ask a question or two about it on every exam and the people who generally get it right, many times on the exam I have seen they have drawn out what I have done or some version of that. Now is it that the people that don’t didn’t find it helpful? I don’t know... or just didn’t get it enough to draw it? ... but I would say that... not every person who gets it right necessarily drew it, but most do. I don’t ask them to draw it, but you see beside the question they have done this little thing for themselves.

The concept of learning through drawing is supported in the learning theory and anatomy teaching literature (Ainsworth, Prain, and Tytler 2011; Balemans, Kooloos, Rogier, Donders, and Van der Zee 2015; Van Meter and Garner 2005). Despite the fact the concept seems relatively simple to understand, students may be challenged with the material because they were trying to both understand the underlying anatomical theory, while simultaneously trying to integrate this knowledge into the practical application of a clinical presentation such as a “herniated disc,” for example. The proverbial juggling of these concepts is often outlined in the cognitive load learning theory literature and drawing the concepts is one of the teaching strategies that has been used successfully to manage the cognitive load on the student (McCrudden, McCormick, and McTigue 2011; Balemans et al, 2015).

Beyond the technical potential discovered of asking her students to ‘draw-to-learn,’ through the process of the interview, Julie discovered that the reason for the bottleneck may have less to do with a need to ‘explain it’ better and more to do with a lack of opportunity for the

students to apply the information and the assessment processes used to test the learning, whether in the classroom or in a practical setting. Because the events in the clinical or field placements are entirely unpredictable, students are often unlikely to encounter practical learning in a way that neatly synchronizes with their classroom learning. In class, they are often practicing feeling for anatomical structures on one another. However, a common problem in Athletic Therapy (and indeed in many clinically based programs), is that there is a challenge in providing a practical example at the moment where it would support theoretical learning. Julie explains:

The problem in class many times is if someone in the class doesn't have something wrong with them we are feeling a whole bunch of normal, and it is not until you feel abnormal that you go, "Ohhh!" like, "I get the difference." We can only hope for people to come in with injuries that we can... people can find that stuff on.

Furthermore, there is a confidence element, which relates as well to the next theme of the emotional component of learning. Julie comments, *"I think they do a better job of it than they think that they do, it is having that confidence that I am actually feeling something."* A very significant element of the Athletic Therapy interviews was the kinesthetic, embodied element, of knowing through touch. This relates to Currie's exploration in Chapter 3.

There was speculation that the technical knowledge itself may not be valued adequately in the field or clinical settings, implying a motivational component. Julie describes how she herself, as a senior student, came to understand the utility of having an in-depth knowledge of anatomy:

I remember there was an opportunity to take an advanced anatomy class in my last year of school and I... learned it at a deeper level and I myself had that epiphany of, "Oh my God, how have I been assessing anything thus far?" realizing how poor my anatomy was,

or how cobweb covered it was until taking that second course, and having a reason to know it in an applicable way, that, for me, was a very light bulb moment.

Our thinking around teaching underlying theory as knowledge and the separation of this knowledge from the application has evolved considerably over time (Rose and Best, 2005). Many professional programs attempt to build clinical competence and in the past, programs separated the theory from the practice in the hopes it would transfer naturally. However, as we have come to understand more, the application of theory should be synchronized as part of the overall learning process and when the two are separated or asynchronous, learning may not be optimal (Rose and Best, 2005).

What was thought to be a cognitive bottleneck with a simple solution (i.e. ‘explaining it’ better), turned into a different solution whereby students need to focus on the experiences designed to make meaning of the concept, whether theoretically by drawing it out, or experientially, by focusing more on the utility of the concept to practice.

Emotional component of learning

As team members engaged in the Decoding process, and drilled down into their own experiences of ‘a-ha’ moments and critical learning, the emotional component to significant learning in the field of Athletic Therapy became apparent. For several of the team members, significant learning experiences in their own practice were accompanied by powerful emotions such as fear and anxiety. Strong emotions may arise when treating patients and making decisions in front of a stadium of people, or when thinking about the potential harm caused to patients by missing an important step in their evaluation or management process. Events that brought forward these strong emotions often became turning points in their own learning.

In a recent publication, Middendorf, Mickute, Saunders, Najjar, Clark-Huckstep, and Pace (2015) have begun to explore emotional bottlenecks as part of the Decoding process. While this work is focused upon student learning in the discipline of history, and the role of pre-existing ideas and belief systems, their point that “cognitive and affective aspects of learning are intertwined” (169) is relevant to our analysis. All of the chapters of this special issue point towards the important spaces outside of cognitive processes where learning lives, whether that is Miller-Young and Boman’s ways of practicing and ways of being, Currie’s notions of embodiment, or Yeo’s hermeneutic dialogic relationship between the discipline and the world (Chapters 2, 3 and 4, this issue).

In the case of the Athletic Therapy students, the emotional aspects of their learning come less from epistemological assumptions or preconceptions, and more to do with the immediate emotions raised by situations creating enormous pressure and anxiety, interpersonal challenges such as telling a coach a valued player cannot return to the game, or fear in a clinical setting of harming a patient. These sorts of bottlenecks to learning surfaced in all of the interviews, but most strikingly in Jason’s. He explains how this learning process was for him as a developing professional, as he begins to consider how to embed this learning for his students:

That is not something that we teach – something blatant that we teach... people are going to be yelling at you and you have to gather as much information as you can so you can explain it to the person... but then how do you manage a situation where all that stuff is going on and you have to focus on one person? Someone is yelling in your ear... It really clicked home the first time I had to go on court and it was like, “I am actually focusing!” ... I can feel my heart racing, I am a little nervous, but I am actually talking to the patient, which is good. And in that same example, we took the patient over to the

bench and having to explain to the coach why they weren't able to go back in... So I bumbled around my words and I kind of gave too much irrelevant information when all I had to say was, "He can't play..." That was one of the experiences that kind of helped me learn to... just stick with the relevant stuff.

The role of experience for the novice in moving through difficult emotional bottlenecks in professional education cannot be overemphasized. The question for the instructional team became then how to intentionally support such learning experiences. Part of the answer seems to be becoming much more explicit in the classroom in terms of an instructor's own experiences as an athletic therapist: how they themselves encountered and navigated such powerful emotional bottlenecks (also see MacDonald, this issue).

Unpacking 'professional intuition' in Athletic Therapy

All of the interviews raised the concept of tacit knowledge in Athletic Therapy, in the intuition or gut-level expertise. Different team members expressed this in different ways. All of the interviews discussed the observational skills, the 'ways of seeing' that Athletic Therapists develop, along with interview skills, manual skills, and the ability to follow a decision tree or other mental structures in order to arrive at the correct diagnosis and treatment. A common theme was the role of extensive experience and reflection in the practice of the AT instructors. The interviews delved into how complex this is for students and the need to break things down for them, and the struggle and strategies the instructors pursue in order to make the implicit explicit. This theme came forward most strongly in Erica's and Kelly's interviews.

Erica explains the bottleneck this way:

They get so burnt out and they are just like, 'Just tell me the list. What is the list that I have to do in order to get through this? And rehab doesn't have a list; it has a bubble

that you try and put together... I think at the end of the day it is so hard for them to have to integrate everything in a high volume program.

Similarly, Kelly explains, *“So it is putting it all together and I find... that they have each of the pieces of the puzzle and it is putting it together that is the biggest bottleneck.”* In their own practice, all of the instructors describe an incredibly complex process of analysis and decision-making. When probed, they describe how they begin their assessment the moment they have visual contact with a patient in the clinic, as Kelly describes, *“So we are looking for any signs and symptoms like swelling, bruising, deformities, and you are also observing when they came in, are they limping? Are they kind of favouring and babying an area?”* In a field context Jason is incorporating his knowledge of the sport, the field conditions, and an intensive observation of the play such that he will usually actually see the injury occur. Each instructor describes the importance of gathering a proper history, but this process is highly flexible and requires judgment throughout. Erica points out, *“if you take a good history you have eighty percent of your answer about the person from the history alone... then as you go through all the physical testing you are basically testing your theory.”* Kelly explains,

They are set questions but they are always geared and pinpointed towards my conversation with you right? So I am going to start a conversation and I know I have all these questions I am supposed to ask in a basket and I don't ask them if I know that I don't need to ask them, and I am not always doing it in a rote manner, right? Because... I am at the point now where I can have a conversation and lead it.

In analyzing the transcripts, instructors began to wonder about a kind of mythology that may develop of ‘magical’ experts, a perception that Athletic Therapists ‘just know.’ Students perceiving this myth may become intimidated or overwhelmed by experts’ tacit processes that

appear impossible to decode for themselves. Students watch experienced therapists apparently skip over steps in practice, yet the consensus is for the expert that one must do each step in sequence for many, many repetitions before the process becomes internalized. When asked what they do when they encounter something they haven't seen before, each instructor describes a process whereby they go 'back to basics' and slow down the steps, and in addition they are quick to consult with other experts as part of their process. In making these processes explicit for themselves, an opportunity is created to make this more explicit for students.

Disrupting practice in the field

An interesting tension appearing in the interviews was the relationship between the field of practice and the academic program. This tension is very common across many professional programs, where students experience theoretical learning on campus integrated with clinical experiences (Rose and Best, 2005). While instructors in the Athletic Therapy program engage in professional practice themselves, there is still often a tension between the field and its perception of the university and the 'ivory tower' as contrasted with 'practical knowledge.' Students will naturally default to the way things are taught in the 'real world' of the field. From the program perspective, instructors can also become frustrated by the gap between contemporary literature and research and current practice in the field. In working with students, for example, in Paul's interview on identifying the correct level for ultrasound, there is a, sometimes unspoken, hope that the students might become positive disruptive influences in the field. He comments,

I have seen probably three generations of students who have gone through under a mentor and they all use a cookbook approach, "We will use it at 1.0 watts per square centimeter for five minutes." For what? For everything! And that is totally wrong to use a pre-set, and yet everyone does it in the industry.

Paul identifies the complexity of determining the correct level for ultrasound as a complex bottleneck for students, but further, this is compounded in the field where students do not see it done correctly by practitioners. Paul explains, *“I think they just don’t value it because they hear people in the industry say, ‘Who cares, it doesn’t really matter.... Ultrasound is useless,’ and yeah, the truth of it is the way you are doing it is useless, but if you do it properly it is actually quite useful.”* The hope for disruptive influence occurs when *“what you are trying to teach them that is more sophisticated than what you see in the field.”* Through the process of the Decoding interview, Paul began to expand on this notion:

We don’t want to create... we are not trying to educate technicians, we are trying to educate critical thinkers... that is why we are in this problem with ultrasound, why so many people do it wrong because we have educated technicians in the past and they just followed a recipe.... I know I want to make a change in the way people practice... I want them to make decisions.

This idea came forward in several of the interviews in different ways. Professional programs rely on the practical knowledge of clinical or practicum placements in order for students to have the opportunity for critical experiential learning. Yet, a tension is created when the practice modelled in the field is not always ‘best practice’ as conceptualized by the program. At the same time, practitioners can become frustrated if they feel university instructors are out of touch with ‘the real world’ of practice. This tension lives itself out in the learning of the students, who do not always know how to understand or work within this tension productively. Students are seeking clear guidance and guidelines in what for them are potentially intimidating contexts, where they are asked to perform skills they are only just beginning to develop, and integrate theory and practice in a complex decision-making processes.

Program and curriculum design, curriculum, delivery, and structure

All of these insights fed directly into decision-making within the program and fueled further discussion and inquiry. At the time of this writing, a second phase of the study is underway about the impact of the new curricular approach on student learning. The AT team will be collecting longitudinal data from students as they progress through the program.

There are a number of curricular delivery outcomes that have resulted from the Decoding experience. The course sequencing and laddering of the curriculum was evident before the experience, but has been significantly reinforced by the experience. For example, it was critical to design the program in such a manner that practical experiences (formal tutorial and practicum courses) are scheduled simultaneously in the same semester so students could see the theory and practice links. Furthermore, it helped to design individual lessons whereby the theory was complemented and reinforced by practical learning activities in either the lecture or the accompanying tutorial. Again, bottlenecks in student learning are often thought of as merely cognitive in nature, but they may also be motivational whereby students only see connections and relevance of theory when there is a very specific practical outcome associated with them. The team began to think about the notion of ‘experience’ versus that of ‘education,’ for example, the difference between depending upon chance exposures in the field, versus thoughtful, simulated, or intentional real-life exposure with application and debriefing, based on specific learning objectives. The former is wishful thinking, the latter is mindful. Finally, it became clear that there is a need for careful professional development for clinical instructors to increase awareness of their own tacit knowledge, helping them to articulate the implicit as they work with students.

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