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Nurturing an adaptive disposition in the context of security training through the approach of Disciplinary Intuitions

Abstract

This paper describes a study-in-progress conducted by a team of researchers and a training school within the security organization of a country in Asia. The collaboration started in October 2015, as part of a larger review of training curricula within the organization. One of the primary objectives of the study is to investigate how the disposition of adaptivity (Hung, Lim, & Jamaludin, 2014) might be fostered among members of the organization. The work reported in this paper describes the initial phase of the study, in which a particular component of the curriculum – the Protection of Critical Localities through Scenario-Based Learning – was observed and dialogued about between the research team, instructors, and trainees, with a view to enhancing Professional Learning in the training curriculum.

Specifically, the study was commissioned to investigate the feasibility of incorporating the theory of learning known as Disciplinary Intuitions (Lim, 2015) into what might eventually be a technologically-mediated curriculum design, which leverages the affordances of immersive environments with regard nurturing the disposition of adaptivity among the security personnel.

Keywords

Immersive environments, intuitions, adaptive disposition, security training, scenario-based learning, scaling and translation

Background and Purpose

This paper describes a study-in-progress conducted by a team of researchers and a training school within the security agency of a country in Asia. Framed as Action Research, the collaboration started in October 2015, as part of a larger review of training curricula within that organization. Apart from the objective of preparing the security personnel for dynamic threat environments, another driver behind the commissioning of the study was the recognition that trainees have higher expectations, as - while they were in secondary education - they took mandatory subjects such as citizenship education, in which the assessment rubric is such that their critical thinking skills were developed. They bring this expectation of having their minds actively engaged in to their training environments.

As one trainee whom we interviewed critically expressed:

“different people have different learning styles, thus certain activities are said or shown to fit certain learning styles, and the question becomes should we follow what the statistics say, and should we use said learning styles for said activity, and to me, I feel that’s not how learning should be done. Learning should not be telling you that this is the best way and proven by most people that it is the best and most efficient way to learn a certain activity, as in you should follow it. I think learning is something that should be explored, be it whether their learning style is most suitable, I think it’s the learner’s responsibility to find

out and not the teacher enforcing it on you, because that makes learning unenjoyable and defeats the purpose.” (Trainee X, personal comm.)

The following section will briefly review literature on simulation-based environments and their possible relationship with the generation of cognitive dissonance, through an emerging theory of learning known as Disciplinary Intuitions. The section also describes a four-dimensional analytical lens through which the surfacing, development and dialogue of such intuitions could lead to the development of adaptivity.

In subsequent sections, key observations from the study are reported through these same four dimensions. The paper concludes with suggestions on how similar approaches to curriculum design might be applied to wider contexts of learning, beyond the military setting reported.

Review of Literature

Simulations offer a powerful way to engage trainees of today and nurture their adaptive dispositions. Because of the added three-dimensional context associated with most forms of simulation, they also develop a trainee’s spatial cognition and the ability to make sense of the local environment. These affordances are recognised by the US Army, which has been using virtual environments in their training. Case studies on the success stories associated with the use of simulation have been relatively well documented, and are primarily founded upon Gee’s (2003) work on Projective Identity and embodied cognition.

With respect to the present study and intervention, the work of the research team has leveraged these environments to surface and nurture learners’ Disciplinary Intuitions (Lim, 2015) from the paradigm that when such intuitions are appropriately developed, learning is more authentic and understanding is more enduring. Disciplinary Intuitions may be thought of as innate computational modules of mind (Pinker, 1997) which are in the process of being exercised and developed as the learner interacts with his or her external environment. The design of the learning environment surfaces such intuitions through the generation of what Festinger (1957) has termed ‘cognitive dissonance’. Briefly, cognitive dissonance describes the feelings of discomfort that result from holding two conflicting beliefs concurrently. When there is a discrepancy between beliefs and behaviors, something must change in order to eliminate or reduce the dissonance.

Festinger suggested that people have an inner need to ensure that their beliefs and behaviors are consistent. Inconsistent or conflicting beliefs leads to disharmony, which people strive to avoid. In his book *A Theory of Cognitive Dissonance*, Festinger explained,

"Cognitive dissonance can be seen as an antecedent condition which leads to activity oriented toward dissonance reduction just as hunger leads toward activity oriented toward hunger reduction. It is a very different motivation from what psychologists are used to dealing with but, as we shall see, nonetheless powerful." (Festinger, 1957, p. 3)

Dissonance theory applies to all situations involving attitude formation and change. Cognitive dissonance can often have a powerful influence on our behaviors and actions. It is

especially relevant to decision-making and problem-solving, because cognitive dissonance plays a role in many value judgments, decisions, and evaluations. Learners consequently are more adaptive in their portfolio of approaches towards complex, dynamic problems.

Adaptive expertise has been outlined by Schwartz, Bransford, and Sears (2005) as a counterpoint to classical Vygotskian notions of expert-novice relationships, in contexts in which goals and parameters are fluid and unpredictable. More recently, Chai, Koh, and Tsai (2013) have elaborated on the interplay between adaptive expertise and Technological, Pedagogical, and Content Knowledge. Of particular relevance to the present paper is the role that metacognition plays in fostering adaptive expertise. Metacognition refers to awareness of one's own knowledge — what one does and doesn't know — and one's ability to understand, control, and manipulate one's cognitive processes (Flavell, 1979; Meichenbaum, 1980). It includes knowing when and where to use particular strategies for learning and problem solving as well as how and why to use specific strategies.

In other words, while cognitive strategies are the basic mental abilities we use to think, interact, and learn, metacognitive strategies are used to ensure that an overarching goal is being or has been reached. It includes the ability to use prior knowledge to plan a strategy for approaching a task, take necessary steps to solve problems, reflect on and evaluate results, and modify one's approach as needed.

Dimensions of adaptivity

Expanding on adaptive expertise, Hung, Lim, and Jamaludin (2014) have described four dimensions which describe the operation of learners within what they term performance-discourse spaces. These four dimensions are namely contextuality, ideation, identity, and sociability.

Briefly, contextuality can be thought of as the learning- and performance-space in which teachers design for learners to interact in. If care is taken to design this space within the Zone of Proximal Development (ZPD) (Vygotsky, 1978) of the learners, opportunities can be designed for learners to be driven by their curiosity / sense of frustration, thereby extending the ZPD. As for ideation, this refers to the actual generation and exploration of ideas; well designed activities will prioritise the generation – as opposed to the premature critique – of ideas. As learners engage actively within contexts, they appropriate particular identities. Learners appropriate epistemic frames of being (Shaffer, 2007) as they engage in their roles within a larger community of learning (Chee & Lim, 2008). Finally, as learners are challenged in their thinking, they engage in metacognition and regulate their performance with others; thus the dimension of sociability is circumscribed.

Taken together, these four dimensions describe primarily the socio-cultural characteristics of a learning environment in which the adaptive disposition might be nurtured. In turn, the possible learning tasks within these four dimensions are informed by Disciplinary Intuitions.

Disciplinary Intuitions

The design of curriculum for formal learning environments often presumes upon (whether explicitly or implicitly) the intuitions that learners bring to the table. These intuitions - to the extent that they exist in the first place - may have been developed through personal experience and prior knowledge, often through non-formal learning such as play. Such intuitions are, however, tacit by definition, and their qualities would vary from learner to learner. Both this tacit nature and this heterogeneity work against the explicit recognition of the role that such intuitions play in the curriculum design of more formalised learning environments; yet they are of critical importance - at the very least in terms of shaping the pre- and misconceptions that learners have, and consequently the likelihood of what is learnt enduring beyond the immediate formalised experience. Disciplinary Intuitions also proposes that the nature of such intuitions varies by disciplinary domain - intuitions about geography are likely different from intuitions about physics, for instance - and that such variations across disciplines need to be recognised, investigated and elaborated upon if learning environments in particular - and curricular designs as a whole - are to be truly effective.

As such, Disciplinary Intuitions may be thought of as innate computational modules of mind (Pinker, 1997) which are in the process of being exercised and developed as the learner interacts with his or her external environment. Conceptualised in this way, Disciplinary Intuitions is distinct from both prior knowledge and misconceptions, in that such intuitions are often developed through non-formal learning (including play) and have not yet been formally codified (let alone verified) by the learner or significant others.

The Disciplinary Intuitions approach differs from the dominant paradigm driving much simulation design in that it does not seek to exemplify concepts to the learners. That is to say, instead of trying to use the simulated environment / scenario as a perfect and complete exemplar for the learners to interact with and investigate, the design of simulation based on Disciplinary Intuitions deliberately seeks to design for learning environments which are incomplete, inconsistent, and puzzling. In this way, learners experience cognitive dissonance and are forced to confront their initial assumptions about the concept in question. The learning task then becomes for the learners to try to modify, edit, or otherwise 'fix' the environment, in order to 'make it right' from their perspective; the point being, of course, that it is not whether the learner succeeds in 'making it right', but that by attempting to 'make it right' in the first place, the learner is surfacing his intuitions about the concept for his / her peers and teachers to dialogue about and develop.

Understood thusly, whether or not existing learning activities are open-ended or convergent to a single correct answer is beside the point - instead, the Disciplinary Intuitions approach goes beyond the issue of open-endedness and seeks to help teachers have an insight into where the pre- and misconceptions of learners are coming from. To belabour the point, it seeks to do so by deliberately provoking dissonance, confusion and puzzlement in the mind of the learner. Such dissonance, confusion and puzzlement is the key to more foundational and enduring understanding, because it provokes both an affective (frustration, bewilderment) and a cognitive response from the learner, and it is by working through the frustration that the learner eventually develops first-principle understanding.

Study focus and methodology

An example of the development of intuitions in a security context would be that security personnel who had spent a greater time in the field / at sea / in the air might be able to differentiate between gunfire / artillery fire, and other subtle or explicit forms of security threats. These more experienced personnel would be able to infer much more information - at an instinctual level (that is, without conscious thought) - than someone new to the environment. An important point to note is that no one actually would have taught or told them to learn to differentiate these nuances; the intuitions were developed through exposure to the environment. The more experienced personnel are able to draw subconsciously from a wider repertoire of datasets when called to make decisions; their decisions are consequently more likely to be appropriate.

Providing less experienced trainees with sufficient exposure for them to develop such intuitions can be costly, in terms of time, money, manpower, logistics, and infrastructure. These problems are compounded because each trainee has a slightly different lived experience / lived environment than his / her fellow trainees. Through the approach of Disciplinary Intuitions, it is hoped to enrich training contexts with a series of common proxy lived environments - which may or may not be technologically mediated - for the trainees to experience, so as to give them more opportunities for their intuitions to be surfaced and developed.

The Disciplinary Intuitions approach can potentially be applied at almost any stage of an existing curriculum design. That is to say, it can be applied as an inductive activity at the start of a curriculum unit, or embedded in the middle for formative feedback, and it could also be used to inform the design of a summative exercise.

The approach is flexible because - through its focus on embodied cognition, affective learning, and the development of first-principle understanding - Disciplinary Intuitions helps learners gradually appropriate the epistemic identity of the disciplinary expert / practitioner (ie, in the present study reported, the epistemic identity of the security personnel). In the words of one of the trainees: "It's very rewarding, because that's one time during training that I can put my boots on and go "Alright", in my head, "I'm a member of a security detail, this is a real situation, how do I get this done"."

Thus, the team worked alongside instructors at the training school with specific focus on understanding how the curriculum unit known as 'Protection of Critical Localities' (POCL), and its associated summative activity of Scenario-Based Learning (SBL) might be a suitable pilot for a technologically-mediated learning environment for subsequent cohorts of trainees. The research team comprised four members, namely the Principal Investigator and three Research Assistants. SBL was chosen because the trainees were presented with role-playing scenarios, which potentially lend themselves well to investigation through the lens of performance-discourse spaces and their associated four dimensions of contextuality, activity, identity, and sociability.

A series of site visits was conducted at the training school, during which Focus Group Discussions were held with instructors and trainees. These discussions were audio-recorded and transcribed, and the participants anonymized. The Focus Group Discussions were

supplemented by field-notes taken during observations of the conduct of training of POCL through SBL.

We conducted six separate Focus Group Discussions with two Senior Instructors, two Junior Instructors, and six trainees in 2015. In the intervening period, we observed the conduct of POCL through SBL. The Junior Instructors and the trainees were between nineteen- to twenty-one-years of age, with the Senior Instructors are about ten years older Trainees and Junior Instructors generally have had high school education. Senior Instructors would have graduated from institutes of higher learning, and would have undergone in-service professional courses during the course of their respective careers.

To augment the trustworthiness of findings (Lincoln and Guba, 1985) we attempted to enhance credibility by observing several procedural precautions. For example, intensive interaction was employed instead of prolonged engagement. The establishment of rapport was enhanced through member checks.

A second precaution taken to enhance credibility was the triangulation of data collection through an exchange of field notes and member checks. Participants were provided with a copy of the transcript from their respective Focus Group Discussions.

Dimensions of adaptivity

The following are key observations from these sessions, expressed in terms of the aforementioned dimensions of adaptivity (Hung, Lim, and Jamaludin (2014)). To reiterate, contextuality can be thought of as the learning- and performance-space that are designed for learners to interact in. Ideation refers to the actual generation and exploration of ideas; well designed activities to cultivate adaptivity will prioritise the generation of ideas. Third, as learners engage actively within contexts, they appropriate particular identities. Finally, as learners are challenged in their thinking, they engage in metacognition and regulate their performance with others; thus the dimension of sociability is circumscribed.

Taken together, these four dimensions describe primarily the socio-cultural characteristics of a learning environment in which the adaptive disposition might be nurtured. As for the possible learning tasks within these four dimensions are informed by Disciplinary Intuitions.

Dimension 1: Contextuality

In the following sections, words or clauses uttered by participants which pertain to the four dimensions that promote Discipline Intuitions are italicized. First, Contextuality refers to the learning- and performance-space in which teachers design for learners to interact in (Hung, Lim, and Jamaludin (2014)).

When asked their thoughts regarding Scenario-Based Learning (SBL), the Junior Instructors indicated their appreciation of context as a critical construct of SBL; in their words, they termed it as 'realism' (perhaps more appropriately construed as 'authenticity'). However, there was a hint of tension between just what would constitute a realistic unfolding of a scenario. Thus, "creating a chaotic situation that is unrealistic might get out of hand so I

generally try to make sure they try to stick to what a normal person might do where they commit the mistake instead of making one that will never happen”.

From the trainees’ point of view, a valuable counterpoint was the view that: “at the end of the day, a lot of it is spent sitting in the classroom and learning theory and a lot of assessment is based on tests, but ultimately when you’re out there in the field, you’re not going to be tested on how well you sit down and recall your laws and write them on paper. It’s not really a test, but when you’re doing your job, you have to be able to react to on-the-ground situations, and if that’s what we are ultimately working towards, logically it makes sense that that’s what we should be training for.”

Another trainee elaborated on the benefits: “The scenario-based learning, whatever scenarios were given, it helped us actually understand things way better, because whatever we have in the book, the book only shows the general problems we might face, but when we enact things out, dealing with the person, not reading the text, dealing with human behaviour, still being calm and composed in whatever situation that arises, it really helps when you go through the motion and learn from your mistakes, what might happen and what might not happen, because you can’t just imagine ‘oh this is what happened’, you should know how to react if something does happen”.

Yet another trainee echoed the sentiments of all, when he said: “I’m really grateful that our instructors make all these props for us to make it that much more engaging, because if we were just imagining, it would make it less real and less fun to enact”.

Dimension 2: Ideation

Scenario-Based Learning (SBL) invokes contextuality which situates the trainees’ thinking and surfaces ambiguous situations that give rise to cognitive dissonance. Ideation, which refers to the actual generation and exploration of ideas, ensues.

The Senior Instructors saw SBL as a means to develop what they termed ‘critical thinking’ (“one thing we want is that whatever they do they can think properly first and whatever they do must be justified”). The Senior Instructors went on to elaborate with “now you are faced with a real-life scenario, how are you going to react? how are you going to apply?” This was echoed by a Junior Instructor, who said that SBL “is one of the few to actually test whether they really understand the theory lesson”.

From these responses, it is reasonable to infer that both the Junior and the Senior Instructors regarded SBL as a means to develop an adaptive disposition. This is echoed from the trainees’ point of view, they felt the value of SBL was “on the ball decision making”, and that “it actually builds a sort of memory where if something else happens that is similar to this, what can you act, what can you do, so it helps in giving experience in that sense”.

Although they were not able to articulate it in terms of Disciplinary Intuitions, the Senior Instructors did approximate the particularised and reflexive nature of Disciplinary Intuitions discourse when they said “the nature of the practice of the training is such that how you see something and how you handle something is totally different how the three of us will do it”,

and likewise “the way they actually tackle the scenario action plans might be a bit similar but there is a peculiarity to everyone of it”. Independently, the trainees echoed the sentiment when they said that SBL “identifies what different people think when they are put on the spot”, and “scenario-based learning showed me that in the same scenario, everyone can react in a totally different way”.

In this, both trainees and their instructors implicitly recognized the importance of surfacing a diversity of naïve responses and behaviours, so that these in turn might be shaped toward a more unified, coherent, and epistemically appropriate end.

Dimension 3: Identity

As learners engage actively within contexts, they appropriate particular identities; in the case of the participants reported in the present study, the identity was that of a member of a security detail on patrol.

The trainees were able to offer deep insight into their own curriculum, again in ways which are congruent with a Disciplinary Intuitions approach. As one trainee put it, “the limitation is the scenario itself. The whole concept of Scenario-Based Learning (SBL) bridges the gap between what you know in books and how you react on the ground. So in that sense, if you want to train someone to become more adaptive, you act it out in SBL and you’re good to go. It makes someone fluent in what to do in situations like that. But in terms of how to react adaptively, that’s not a limitation of the concept of SBL but of the scenarios themselves. So if you want someone to be more adaptive, just give them tricky scenarios.”

The trainees went on to elaborate just how scenarios might be made “tricky”. The following were typical comments: “So I was thinking to myself, why do we even need to be given the situation, why don’t we just, if we wanted it to be as nuanced as possible, if we want to test how well they think on the ground, why don’t we just give them any context at all. Like ok, you’re in an installation, and that’s it, and just throw whatever you want at them. If it’s something you don’t know anything about, you’re forced to think completely on the spot”, “Because if the context is vague, you yourself have to narrow it down”.

Dimension 4: Sociability

As learners are challenged in their thinking, they engage in metacognition and regulate their performance with others. In the context of the present study, the primary scaffold provided by the instructors was debriefing sessions before, during and after the exercise. In the words of the Senior Instructor, “before we actually throw in the first practice they are required to read out their action plan to the whole group. So that is when we actually figure out what is actually going on in their head. So the thinking process is how they work out something and after the first practice, they trip and fall a bit, stumble a bit. Then they rework the whole thing. The idea with the post-activity sharing is to provide them with a course-level sharing on how the difficulties they actually faced”.

When asked to identify the most important component in the overall Scenario-Based Learning flow (apart from the actual enactment of the role-play itself), the Junior Instructors

identified the immediate debriefing after the activity. As they put it: “it is during each individual group debrief when they really can see what just happened then they can target whatever just happened straightaway. And it is also because the experience is just fresh”, “I will task those who are weaker in knowledge and skills and let them have a try and see whether they can reenact the scene”, and - critically, in terms of identity appropriation - “So those who are weaker in this scene I will try to push them and let them have a taste of being on patrol duty”.

As for the Senior Instructor, he identified the importance of cognitive dissonance as a factor for an effective overall review after the whole activity. In his words: “when you are experiencing something during the whole activity if something very significant has happened, something uncalled for and you can’t react to it and you know you have just been surprised and you can’t handle it properly. So emotionally it has some impact on you. So I think when that happens during the course level you want to share it because it’s something very significant”.

Disciplinary Intuitions and the adaptive learner

This recognition by the Senior Instructor of cognitive dissonance as a factor for an effective review activity provides an appropriate lead in to how Disciplinary Intuitions might inform desired training and learning outcomes. A point of great interest was the management of the tension between the structure of the debriefing sessions before, during and after the Scenario-Based Learning (SBL) and the recognition of the need to be adaptive. This is illustrated by the following comments from trainees: “we also emphasise a lot on reviews over here, but this is a long process, so we can’t really use it all the time. Maybe we can prepare for certain scenarios, but when some things really get out of hand, something unexpected happens, these snap judgments, I feel are more important on the ground”; and, “when you’re doing SBL, you cannot blindly follow the procedure; you try to stick to that procedure as much as possible, but sometimes the situation doesn’t allow that, so you have to make your own call, like where do you tweak the procedure”. Another elaborated, “As for whether did we think about this before the activity, no. Honestly, everything that happened at that moment wasn’t prepared. Whatever we did was basically to ask the antagonist to calm down, to defuse the situation, we didn’t even know he had a weapon”.

These comments highlight that in truly authentic scenarios, there is a great deal of extemporising and improvisation going on, as the trainee seeks to make sense of the situation on the fly. In situations such as these, the trainee draws upon tacit intuitions which might inform his / her observations. The more congruent these intuitions are with respect to the protocol, the more likely the trainee would be able to resolve the situation appropriately. In turn, the congruence is dependent upon the successful appropriation of the epistemic identity of - in this case - the security personnel. As one trainee elegantly put it, “in the spur of the moment, all of us react to a situation differently, even though we are teammates / partners as well, so that poses a challenge for sure, because what I’m thinking is like, if you put an apple in front of you, I might look at its colour, he might look at its shape, he might look at how big it is”. The management and mediation of issues such as these would seem to present a naturalistic lead in to a curriculum informed by Disciplinary Intuitions.

Thus, the trainees were asked “what constitutes a ‘suspicious person’”. The trainees’ responses were “the way they act, the way they dress, you take a few moments to observe them what they are doing”, “how they respond to your presence” and “your brain must always be thinking of what’s going to happen next”. Interestingly, when probed further with the question “how would you make an assessment of how they respond?”, the trainees resorted to “books themselves, whatever I read; they give some characteristics of what suspicious people do, how will they act. All these are taught in theory, so when we read all that, and then observe and see whether that matches with what we have learnt.” The existing books are needed, and can continue to be used, for - as one trainee put it, “I think it takes time for us to even master the scenario, so it’s still small steps”. Nevertheless, this reflexive recourse to book knowledge suggests that there is potential for a Disciplinary Intuitions approach to be used earlier on in training, rather than just during a summative SBL activity.

To be fair, the same trainee did go on to demonstrate an appreciation of nuance, because he subsequently said, “Many of them, they will over-exaggerate so it’s made easier for us to identify, but of course it’s a bit more difficult in real life”. Indeed, and this is precisely why a case might be made to surface as early as possible the existing intuitions of trainees about the important construct of ‘a suspicious person’.

To their great commendation, the trainees were able to demonstrate high levels of metacognition, as evidenced by: “The whole success of the situation on any mission is how we coordinate with each other. It’s hard to communicate and coordinate with your partner because you yourself are already stuck in the situation trying to calm the antagonist down. So you become very narrow-minded, you only want him to do one thing, basically you want him to fall into your trap”.

From the Focus Group Discussions, it was clear that both instructors and trainees alike saw value in SBL. Further, although they had not yet appropriated the discourse of Disciplinary Intuitions, they certainly recognized the importance of task authenticity, tacit knowledge, and reflexive responses in the effective conduct of the scenarios as they unfolded. As the phase of the study described in this paper drew to an end, it was therefore recommended that a strategy be put in place for subsequent cohorts of trainees, in order that their experience of SBL might be mediated through technological means, with a view to a more seamless appropriation of the epistemic identity.

Since 2009, the research team has developed extensive expertise in the scaling and translation of immersive environments for learning. Immersive environments do serve to augment the Disciplinary Intuitions approach significantly, through what Gee (2003) has termed Projective Identity. Essentially, learning is more impactful because the learner has an embodied sense of the learning experience through performance as avatar. Such embodied cognition serves to positively reinforce identity appropriation (Shaffer, 2007) and helps trainees adopt more deeply the epistemic frame.

As such, it was recommended that the Disciplinary Intuitions approach be complemented by an immersive environment such as the open-source OpenSim, or the proprietary Second

Life. These platforms serve well as common proxy environments for the surfacing and development of learner intuitions. They are also easily learnt by novices; for example, typically, twelve- and thirteen-year-olds from regular government-funded schools have been observed by the research team to pick up basic skills of movement and building within their first hour. The platform can run on any portable or desktop Linux, Mac, or Windows PC (excluding tablets such as those running iOS and Android).

A major advantage is that - if needed - the environment can be set to run entirely within a secure local area network (LAN) with no outside connection to the wider internet. Another advantage is that because the immersive environment is - by definition - three-dimensional, it can also be used to help surface the navigational and wayfinding intuitions of security personnel, to better help them in reading maps and interpreting topography.

Scaling and translation of technologically-augmented interventions could only go so far if it be not complemented by a parallel programme of Professional Development and investment in Professional Learning. So as to design for self-sustainability, a series of 'training of trainer' workshops would need to be planned for and conducted. During such workshops, participants would be introduced to Disciplinary Intuitions, and would work closely with members of the original research team, and with each other to incorporate the approach into a variety of existing curriculum structures.

Conclusion

This paper has made the argument that the nurturing of an adaptive disposition begins with the surfacing and subsequent dialoguing and shaping of the intuitions which learners bring to the learning environment. It has reported a study at a security training facility, with respect to incorporating Disciplinary Intuitions into existing curriculum. The study has suggested ways forward with respect to nurturing adaptive dispositions among trainees, while leveraging existing curriculum supports – both technological and otherwise. The design approach of the intervention reported sought to surface the intuitions which trainees brought to their learning environment, so that these intuitions could subsequently be dialogued upon with their peers and instructors. Four dimensions of adaptivity have been suggested – namely, contextuality, ideation, identity, and sociability – through which the observations of how trainees and their instructors respond to the curriculum might be described.

The study has also set out some recommendations with respect to scaling and translating the Disciplinary Intuitions approach into other contexts. Such pathways to scaling and translation are not contingent upon technology-rich learning environments, but would nevertheless certainly be augmented by them. Finally, through the establishment of a 'training of trainers' model, it is hoped that a self-sustainable and virtuous cycle of sound curriculum design supported by well-versed content developers will help to foster adaptivity among the trainees.

Although the present study was set in a security context, wider implications towards the design of learning environments in other contexts of education might be drawn. An example from professional learning might be in teacher education. Given the increasing diversity of

learner demographics in classrooms and other settings of learning, questions which might be valid with respect to nurturing an adaptive disposition among trainee-teachers might include: what might the nature of the intuitions which trainee-teachers bring to pre-service teacher education courses, with respect to appropriate strategies of intervention? How might such intuitions be surfaced and dialogued upon in ways which are safe and perceived as non-prejudicial by both the trainee-teacher and the students under their care? In turn, how might such intuitions feed and reinforce the nascent and developing epistemic frame of the trainee-teachers, with respect to themselves as education professionals? This paper suggests that these – and similar questions – might be addressed through the fourfold lenses of contextuality, ideation, identity, and sociability. Through these dimensions of adaptivity, learning settings designed for a variety of learner demographics may be analysed.

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