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Professional development for scaling pedagogical innovation in the context of game-based learning: Teacher identity as cornerstone in “shifting” practice

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A dominant discourse on “scaling-up” small-scale innovations based on a limited number of successful classroom trials pervades the educational literature. We view this discourse as insensitive to the professional work of teachers and the human side of school change. Our research investigated how teacher professional development could be conceived and conducted to support take up of digital game-based learning in the context of a three-week social studies unit on governance and citizenship. Students played a mobile game in their own time. In the classroom, teachers enacted dialogic pedagogy to facilitate students’ meaning making of their game play experience. Our findings indicate that teacher identity, constituted by their interwoven knowing–doing–being–valuing, is central to any effort to scale pedagogical and technological innovation. We modified our original model for the appropriation of innovation uptake by teachers to one that places teacher identity as the centrepiece of the model and cornerstone in “shifting” teacher practice.

Keywords: games; identity; professional development; scaling

Introduction

Game-based learning has been held out as an educational innovation that offers the promise of enhanced learning and education (Shaffer, Squire, Halverson, & Gee, 2005).

Interest in the use of digital games has been spurred by the writings of Prensky (2001) and Gee (2007). However, Prensky and Gee hold different conceptions of game-based learning. While Gee’s goals are oriented toward the development of new literacies and emphasise active learning, situated meaning, multimodality, intertextuality, and the

development of learner identity, Prensky focuses on content mastery coupled with greater learner engagement. In a meta-analysis of empirical evidence related to the use of digital games in education, Connolly, Boyle, MacArthur, Hainey, and Boyle (2012) report that digital games have been used primarily to support knowledge acquisition and improve motivational outcomes—goals advanced by Prensky. A literacies oriented perspective on game-based learning (Apperley & Beavis, 2011), making connections to students' lifeworlds (Walsh, 2010), remains the exception rather than the rule.

Teachers require considerable professional support to use games to achieve higher order learning goals in conjunction with the adoption of more advanced pedagogies (Ketelhut & Schifter, 2011). Kirriemuir and McFarlane (2004) report that teachers lack the time to familiarise themselves with games. They also have difficulty integrating available games into the curriculum and determining ways of producing the best learning outcomes from game use. Bourgonjon and Hanghøj (2011) argue that teachers must further develop a form of game literacy that connects video game understanding with curricular knowledge, school-based pedagogical practices, and students' everyday knowledge of games and game genres. In the light of these challenges and a general lack of professional support, teacher appropriation of game-based learning that extends beyond content mastery has been limited.

In contrast with dominant discourses on educational technology that centre on ICT integration in classroom teaching, we focus on the use of digital games as technologies for educational innovation. Recognising that videogames constitute a form of designed experience where situational context is a critical learning affordance (Squire, 2006) and that such games allow a turn from "learning about" some subject content to "learning to be" some kind of person through immersive role taking (Thomas & Brown, 2007), our research advances the use of authentic digital games to promote

the development of student identity and learning related to curricular goals. Our efforts have focused on providing in-service teachers with professional support to develop the capacities for enacting this form of game-based innovation. In this paper, we provide evidence to suggest that the key challenges associated with weak teacher uptake of game-based learning are pedagogical more than technological. These challenges are intimately tied to cultural assumptions concerning professional practice. Educational games, used in conjunction with dialogic pedagogy (Wegerif, 2013), foreground the vital importance of attending to teacher identity when conceptualising and conducting teacher professional development. We share how our literature-derived initial model of innovation uptake evolved into a revised model that places teacher identity as centrepiece of the model.

In the next section, we examine the importance of teacher narratives in professional development. We argue for adoption of a humanistic approach to educational innovation that places teachers' identity and personal practical knowing at the centre of the change process. Next, we elaborate on the context of our game-based learning research and share our original appropriation model of innovation uptake. We then articulate our research method and approach to data analysis. Following this, we present our research findings. Our revised model of innovation uptake emphasises teacher identity as a cornerstone in "shifting" extant practice. We provide evidence for the importance of teacher identity by means of excerpts from teachers. We discuss our findings and identify pertinent implications before concluding the paper.

Importance of teacher narratives in professional development

Classroom teaching practice is a complex professional activity. According to Simpson and Jackson (1984), teaching entails grappling with ideological, political, curricular, structural, procedural, and personal decisions. Research on teacher thinking suggests

that issues concerning the teacher's perspective and voice, the complexity of "ordinary" teaching, and narratives of teaching and autobiography that help teachers sustain professional life are important (Elbaz, 1990).

Educational innovation depends ultimately on teachers' capacity and readiness to enact change in classroom practices. Professional development support is essential to facilitate such change. Unfortunately, the quality of professional development is often fragmented and intellectually superficial, failing to take into account what is known about how teachers learn (Borko, 2004).

From the perspective of Dewey's pragmatic ontology of human experience (Dewey, 1925/1988), Clandinin (1985) argues that teachers develop and use a special kind of knowledge called personal practical knowledge. Such knowledge is non-propositional and constituted by blending both theoretical and practical under the influence of a teacher's personal background and characteristics. Personal practical knowledge is manifested in particular situations, with action and knowledge united in the teacher-as-actor. Such knowledge is personal in the sense that it participates in and is imbued with all that goes to make up a person, having arisen from circumstances, actions, and undergoings laden with affect (Connelly & Clandinin, 2003). From a teacher's perspective, personal practical knowledge is deeply entwined with identity (Clandinin, Downey, & Huber, 2009). Approaching identity through the medium of narrative and the "stories that teachers live by" allows teachers to tell who they are and who they are becoming.

Connelly and Clandinin (1985) argue that narrative unity, image, and rhythm are vital aspects of personal practical knowledge. Narrative unity is defined as "a continuum within a person's experience which renders life experiences meaningful for the unity they achieve for the person" (Clandinin, 1985, p. 365). Narratives, or stories,

are temporal accounts of transformation. Through the media of time and space, people, things, and events reflect, and are seen to reflect, one another (Clandinin & Connelly, 1992). A teacher's narrative unity and imagery are also modulated by the rhythms of classroom teaching, as evidenced by the repetitive and cyclic manner in which instructional units are "covered" (Clandinin, 1989).

The careful study of teacher narratives allows us to frame teacher development in terms of a theory of becoming, where learning is constituted by the dialectic between being and becoming (Newman & Holzman, 2014). Through this humanistic, narrative turn (Polkinghorne, 1988), we can interrogate the complexities of professional ways of being and the ambiguities of becoming (Dall'Alba, 2009; Vinz, 1997) through the narratives teachers share of their storied lives (Craig, 2013; Schatz-Oppenheimer & Dvir, 2014). From this perspective, professional practice is not merely a "container" for the execution of knowledge and skills learned in a decontextualised way (Dall'Alba & Sandberg, 2006). Professionals intersubjectively constitute practice by developing an embodied understanding of the workings of a specific institutionalised order. Learning a professional practice is fraught with ambiguity because such learning entails coping with inherent situational change over time, wrestling with new ways of being in the face of constraints, dealing with fresh possibilities that may invite resistance, and having to engage with other professionals in an interdependent relationship (Dall'Alba, 2009). For these reasons, practice is not a fixed or static container but a dynamic flow produced and reproduced by professionals. Walkington (2005) suggests that creating a space for reflective practice can foster teachers' development of professional ways of being—that is, their becoming. Professional development that focuses only on the acquisition and application of knowledge and skills falls short of this goal. To enhance embodied understanding, teachers must have the opportunity to receive critical

feedback on their performance. They must also be given the opportunity to interrogate such feedback in ways that deepen personal understanding, growth, and identity (Dall'Alba & Sandberg, 2006).

Despite extensive research that has illuminated the challenges and issues related to teaching practice, change, and professional learning, there exists a pervasive discourse of scaling-up exemplary educational innovations shown to have been successful on a small scale (McDonald, Keesler, Kauffman, & Schneider, 2006). In a quest for determining “what works” to produce sustainable improvements in school-based learning across a diverse student population, researchers are asked to pay greater attention to “scale-up” research based on randomised controlled field trials. Such a perspective ignores the human side of school change (Evans, 2001) and the need of teachers to find personal meaning in their life and work. Engeström (2011) illuminates how over-emphasis on technical rationality can suppress attention to the local dynamics of change, innovation, and resistance in the activity of schooling.

Game-based learning and the appropriation model of innovation uptake

Our teacher development work was formulated to help schoolteachers enact the *Statecraft X* game-based learning curriculum in the classroom. We entered into this work by helping teachers to confront problems actually faced in the classroom, supporting teacher reflection on classroom practice, furnishing teachers with additional information and viewpoints to aid reflection, and supporting teachers’ freedom of choice for follow-up actions, as encouraged by Day (2003).

The *Statecraft X* game is a multiplayer real-time strategy mobile game played on Apple iPhones. The game helps students understand governance in relation to citizenship in the context of social studies. It was designed as an “authentic” game based on learning principles articulated by Gee (2007). Thus, the goal of learning is not

the acquisition of subject content represented propositionally but the mastery of performance capacities related to authentic social roles (Chee, 2011). Performance mastery extends beyond allowing learners to represent their understanding propositionally. It is an enactive capacity, not an acquired representation. Lack of space precludes a detailed description of the game here. (See Chee, Gwee, and Tan [2011] for details.) The curriculum is predicated on students playing the *Statecraft X* game in their own time, outside class hours, and participating in dialogue—with one another and with the teacher—in the classroom. During scheduled social studies class time, teachers facilitate students in making sense of their in-game experiences with a view to helping them distil pertinent takeaway ideas and personal values associated with governance and citizenship. From a dialogic perspective, there are no right or wrong answers to questions such as “What is a good government?” and “What is a good citizen?” Rather, the objective of dialogism is to deepen students’ understanding of the complexities of governing—and to thereby distil a conception of “good governance”—based on expansive rather than convergent learning conversations with one another. We concur with Wegerif (2013) who views dialogic pedagogy as “education *for* dialogue as well as *through* dialogue” (p. 33), such that dialogue is not only a means to an end but also an end in itself. Aligned to our theorisation of learning in terms of identity and becoming, however, we also hold that dialogue is not only epistemological, but also ontological (Sullivan, 2011), following ideas advanced by Bakhtin (1981). Thus, dialogue constitutes both a theory of knowing as well as a theory of being, based on the Russian notion of *pravda*—“truth as lived”.

Having achieved good student learning outcomes with the *Statecraft X* curriculum (Chee et al., 2011), we sought to “scale” (not “scale-up”) the pedagogical innovation in the sense of encouraging its uptake by more schoolteachers (not the

notion of increasing an innovation's implementation by some multiplicative factor, as conveyed by the term "scale-up"). To this end, we reviewed existing literature related to scaling educational innovation and to educational reform to construct a working model that could guide our professional development efforts. In short, the model would be a "tool to think with," not a model to verify empirically. The "appropriation model of innovation uptake" we constructed (see Figure 1) was inspired by Coburn (2003), who argues in favour of emphasising deep and lasting change through educational reform and against conceiving scale numerically.

Insert Figure 1 about here

From a system perspective, Coburn (2003) suggests that four interrelated dimensions of change are important: depth, sustainability, spread, and shift in reform ownership. From a teacher development perspective, we re-purposed several of these constructs to serve the goals of our research. In particular, we separated "shift" from "ownership". This move allowed us to focus on the "shift" in teaching practice—framed in terms of skilful enactment of dialogic pedagogy in conjunction with the use of educational games—which we wished to support. We added a fifth dimension, that of "design re|construction" to encompass teachers' iterative reconstruction of an innovation as they adapt it to their own needs within their specific socio-cultural setting, as suggested by Clarke and Dede (2009). Thus, the innovation uptake model's emphasis on teacher appropriation makes it a teacher-centric model of change.

Method

Our overall research project is constituted by a coordinated set of case studies—the collective case study (Stake, 2006)—through which we sought to develop a coherent

understanding of how teachers appropriate the practice of game-based learning. Our study comprises nine cases, with each case representing one of the nine teachers with whom we worked. The teachers were invited by their respective school leaders to participate in the research. They accepted the invitation readily and viewed it as an opportunity to enhance their professionalism in teaching. All teachers consented to participate in writing. The University's Ethics Committee approved our research study. Classroom interventions took place between January 2012 and February 2013. The duration of each Statecraft X curriculum intervention was three weeks.

Participants

The nine participating schoolteachers taught social studies in five separate government secondary schools. Six teachers were female and three were male. They taught 15-year-old students in either the Express or the Normal (Academic) stream in the Singapore school system. Express stream students complete the General Certificate of Education "O" level examination in four years, while Normal (Academic) stream students take five years. Five teachers enacted the Statecraft X curriculum twice with different classes; the remaining four enacted it once. The teachers were informed about the goals of the research. They signed a consent form prior to participating in the research.

Materials

All teachers attended an initial two-day professional development workshop during which they were introduced to dialogic pedagogy, game-based learning, and the *Statecraft X* game. As part of initial preparation, they were required to play the game as a student would for five consecutive days. During the research intervention, teachers were given access to the game's web-based "Teacher Administration Tool" that allowed them to monitor how the students, organised in their game factions, were performing in

the game. Teachers also used this tool to share the Economic Wealth and Citizen Happiness graphs with their students. These graphs allowed students to visualise their performance, in terms of these two key indicators, over time.

Procedure

Each intervention cycle comprised six classroom lessons spread over three weeks. The duration of each lesson ranged between 45 and 60 minutes. Teachers were interviewed once before the intervention commenced. Post-lesson dialogues were held after lessons 2 through 6. A set of structured questions was used to provide initial guidance for these conversations. The conversations provided teachers with a reflection space where they could revisit their just-concluded lesson and interrogate their classroom actions and student facilitation behaviours more deeply. Research team members facilitated the process. They guided teachers on how they might enhance their dialogic facilitation, suggested ways to deal with challenges that arose during the lesson, and provided encouragement and emotional support throughout the process. The post-lesson dialogues were audio recorded.

Data analysis

We transcribed our corpus of conversations with teachers. They lasted approximately 40 hours in total. Two transcribers worked on this task, and they crosschecked the transcription to resolve ambiguities. The transcripts were systematically organised and indexed to facilitate identification.

Initial efforts on data coding began after about one half of the transcription work had been completed. We sought to distil, categorise, and organise ideational units from teachers' post-lesson reflections, with a view to the eventual identification of coherent conceptual motifs. At this stage of the analysis, the primary aim was to get a feel for the

data and to construct a coarse scheme of first-level categories and sub-codes. We found it appropriate to be guided by the categories “depth”, “shift”, and “system factors” that comprised the input and process aspects of the appropriation model. At this juncture, there was no evidence of teacher discourse related to ownership. As our classroom work progressed and encompassed more teachers, we were struck by attitudinal and behavioural differences manifested by teachers, as well as the range of outcomes they achieved with their students. This observation suggested the need for an additional category, which we added and named “teacher identity”.

As transcripts from additional teachers were incrementally considered, sub-codes were added, moved, and regrouped. Approximately halfway through the coding process, the first author’s framework for studying human learning, derived from separate research, was drawn upon to streamline and rationalise the sub-codes related to teacher identity, thereby yielding a more parsimonious set of codes. The coding scheme became final in version 8, indicating the complexity of the task and the recursive and iterative nature of coding that required repeated review and consensus building amongst team members. In the final coding scheme, only one other first-level category emerged: that of “social dimensions”, referring to manifestations of power relations in the classroom. Data management and coding were performed in NVivo version 9.

Findings

As Statecraft X lesson observations and post-lesson conversations with our teacher collaborators progressed, we became increasingly aware that the challenges teachers faced in the classroom had less to do with the technology related to the game than with difficulties enacting the curriculum’s dialogic pedagogy. Being mostly accustomed to subject matter exposition followed by assigning students worksheets to complete, teachers found they had to work in real time with ideas that students were contributing,

based on their game play experiences. This different student behaviour effectively altered the culture of the conventional classroom where teachers exercise full control over classroom proceedings. The teachers now found themselves having to think on their feet, a mode of behaviour they were unaccustomed to. This change unsettled them, but they drew strength from knowing that their school leaders supported their efforts in pedagogical innovation. The change triggered reflexivity and prompted the teachers to reflect more deeply on their past and present practice. These processes strongly indicated the need to incorporate “teacher identity” as an additional factor in our original model of innovation uptake.

To include teacher identity, we drew on Chee’s (in press) general framework for undertaking research on human learning. In this framework, a learner (including a teacher learning a new pedagogy) is constituted by her knowing–doing–being–valuing (see Figure 2). In short, knowing, doing, being, and valuing, representing epistemological, praxiological, ontological, and axiological dimensions, are multiple facets of a learner’s identity. These facets are inseparable and interwoven. Focusing on any one facet necessarily entails consideration of all other facets as well.

Insert Figure 2 about here

Based on the foregoing, we revised our appropriation model to reflect teacher identity as an instrumental factor in innovation uptake. The revised model is shown in Figure 3. It depicts how teachers work through a complex process of shifting their practice: a process whose outcome cannot be predicted in advance (hence depicted as a wavy line) because the journey “forces” teachers to interrogate deeply their knowing–doing–being–valuing through reflection and reflexivity. For teachers who succeed in

shifting their practice, the journey is transformational as teacher identity is reconstructed. The revised model locates our research in the context of 21st century literacies, with the use of authentic games and dialogic learning, and the broader space of educational reform.

Insert Figure 3 about here

In what follows, we first cite research data excerpts to exemplify our claim that teacher identity strongly influences the shifting of a teacher's habituated classroom practice. We do so in terms of the four facets of teacher identity. After this, we pull the ideas together through a brief narrative of one teacher's change in identity. The illustrations provided are primarily illustrative and by no means exhaustive. Although they do not draw upon all nine teachers who participated in our study, the examples represent common and stable patterns of responses from the teachers who were all trained in the same teacher preparation institute, taught social studies in the same nationally defined curriculum, and taught in typical government-funded secondary schools with a homogenous school culture.

Epistemological

Teachers' beliefs concerning knowledge and how students come to know strongly influence how they position and use a subject textbook in the classroom. About midway through the research intervention with the teacher Stephen (all names used are fictitious), he shared:

I have not explicitly told them to read the textbook or anything as yet. Uh . . . it's a resource. . . . previously we used to use the textbook as a sort of Bible, if you will. You see, you refer to it, the content is there, you write your essay based on the

content there . . . But now I'm beginning to understand a bit more that it's about bringing across the concepts. And it's in their essays – it's their understanding of the concepts, which is more important than the regurgitation of facts from the textbook. . . . So the textbook hence becomes now a guidebook in a way – it's a set of notes, but it doesn't encompass everything. So you know that's been a shift for myself, you know.

Through our professional development work with Stephen, his view of the textbook as a resource for students to refer to rather than as “a sort of Bible” to be adhered to as doctrine marked a significant “shift” in his epistemological position. Whereas, in the past, he would expect his students to write their social studies essays based on content in the textbook, he now recognised that “it doesn't encompass everything.”

Furthermore, he was less concerned with students writing their essays in a manner consistent with authority-endorsed textbook claims and more taken up with their understanding of concepts, such as those of governance and citizenship.

Praxiological

Facilitating dialogic pedagogy calls for very different behaviours, on the part of teachers, from the manner in which they customarily teach. Toward the end of her first enactment of the curriculum, Annette reflected on the change in her classroom praxis as follows:

So previously as a teacher we are supposed to prepare a lot for every lesson, you know, slides need to be done, hand outs need to be printed . . . But I guess for this Statecraft is that the preparation work . . . does not come in tangible form but . . . from thinking on your feet, and every minute you need to listen intensely to what your student is talking: what he's trying to say, paraphrase it and make sure that . . . uh everybody in the class has a common understanding. So it makes me think that, you know, like from a tangible preparation, I move on to an intangible preparation. . . . But actually in hindsight I find that every session I can get pretty exhausted mentally. Because I'm on high alert always . . . ok make sure that I

catch the right things coming from the students because sometimes they can be a bit incoherent. So I need to think ahead of them and help them to think . . . So it is a lot of mental effort. But, when it comes to normal classroom teaching with PowerPoint slides, mental effort is not really there but there is a lot of physical effort, because ok “class sit down, take out your textbook,” classroom management, so on and so forth, but over here at Statecraft is a totally different ballgame altogether.

The above excerpt illustrates how the kind of preparation that teachers need to engage in before a lesson changes qualitatively. From Annette’s point of view, it shifts from “tangible” mundane physical effort to “intangible” mentally effortful work. Moreover, in class, teaching based on PowerPoint slides requires low mental effort, but supporting dialogue is mentally exhausting and constitutes “a totally different ballgame altogether.”

Ontological

At the conclusion of Annette’s second enactment of the Statecraft X curriculum, she was asked to reflect on what her learning journey had been like. In response, she drew upon the metaphor of the life cycle of a butterfly—developing from egg into caterpillar into pupa and then transforming into a fully-fledged butterfly—to convey poignantly how her journey had been deeply personal and transformative. She said:

I remember I learned that, when I was in like primary 5, . . . the lifecycle and things like that. . . . So . . . I mean, if you were to ask me, I use this to describe my journey that, you know, initially it was like just an egg – just an enclosed cocoon like with nothing in a shell, then you know slowly hatch and learn to crawl in . . . you know in . . . Ok ok, I’m finding my way around, slowly crawling, and towards the end I can fly and soar like a butterfly.

The excerpt above highlights the process of professional growth that Annette had experienced as she started “with nothing in a shell,” which then hatched, and she

began finding her way around, “slowly crawling,” and growing in confidence as she developed mastery of the curriculum’s dialogic pedagogy. At the end of the journey, she could “fly and soar like a butterfly”—a powerful manifestation of professional learning framed as the dialectic between being and becoming.

Axiological

Toward the end of enacting her first cycle of the Statecraft X curriculum, Patrina provided insight into how her values had changed in the following terms:

In the past um, . . . you know, like discussion like this it would go dead. But then now I realise that “No, it is possible. It is possible with the kids.” And . . . this whole thing, it has taught me to let go. In the past it was you know like ‘control freak’—I want to control this, I want to control that . . . But, when you learned to let go, the take back is a lot more. I think that is really key for me.

At the conclusion of her second cycle of the curriculum, Patrina further shared:

Now it's really going to lesson not knowing, not thinking too much on your own, [or else] we end up imposing our ideas on them. And that is challenging. I think it's a human thing as well that I have certain thoughts and I want to share with you what my thoughts are. But now really giving them that power, to empower them to think, I think it's a reversal kind of thing that we have to do.

The excerpts above illustrate significant changes in Patrina’s values. From highly valuing control over classroom proceedings and being a “control freak,” she began to “let go” as she developed the confidence to trust in her students’ ability to engage in meaningful dialogue. In the end, Patrina felt that she should not impose her ideas but “empower” her students by giving them space to articulate their thinking—a “reversal kind of thing” that reflects a deep shift in her professional values.

Putting it together: change in teacher identity

Shortly before we concluded our work with Patrina, we took the opportunity to query her on her “identity as a Statecraft teacher.” Patrina responded:

I think, as mentioned previously, I definitely take greater ownership towards the curriculum, and I think um the biggest change is my identity as a teacher, as well as a Statecraft X teacher, is that the way I teach is different. . . . It has changed. Um, greater openness?

When further probed on what she meant by “greater openness,” Patrina elaborated:

I think the openness to really hear and accept what the kids are saying . . . instead of always thinking . . . you know something that they say I need to correct something that they are sharing. But now I feel like I don't need that. . . . they are kind of like ‘auto-correct’ for each other, and they have the ability to do that. So I think with this confidence, when I go step into the other classroom, I can identify myself as a Statecraft X teacher, but at the same time I identify myself as . . . a teacher who is really open to hear what the kids are saying . . . and getting them to auto-correct each other, and I think learning is definitely effective in that manner.

The excerpts above disclose a marked shift in teacher practice and illuminate a clear change in teacher identity. Not only did Patrina express the feeling of “greater ownership” over the curriculum, but she also revealed how her readiness to “hear what the kids are saying” and the confidence that her students can “auto-correct” one another were appropriated into her interactions with students in another classroom—an indication of the “spread” of a new teaching practice.

Other factors

We turn now to the other factors in the original appropriation model of innovation uptake. With respect to depth, we felt that our pre-intervention workshop, which required teachers to play the *Statecraft X* game themselves over an extended period of

time, achieved its intended goals. As a “training event,” however, it could not fully prepare teachers for what was to come. Thus, while reasonable depth of understanding concerning the curriculum may have been achieved, enactive depth remained elusive.

Concerning ownership, all teachers felt they had adequate ownership over the implementation of the curriculum, as affirmed by Patrina above. We believe that ownership did not surface as a factor of concern in our data because (1) teachers participated in the research voluntarily, and (2) they were given ample opportunity to make operational changes to how they enacted the curriculum.

We experienced no significant challenges with regard to system support because school principals provided the needed administrative and moral support. We firmly believe that this support is critical for successful curriculum innovation.

We witnessed some evidence of spread of the pedagogical innovation, as indicated in the excerpt from Patrina. Given that the topic of governance in social studies is conducted only once every school year, we were unable to study systematically the factor sustainability. Nevertheless, one school informed us that the two teachers there enacted the Statecraft X curriculum on their own in the following school year.

Discussion

Current interest in the use of digital games in formal learning is marked by two contrasting paradigms: that of games-to-teach and of games-to-learn (Chee, in press). The games-to-teach paradigm represents a revival of the era in which multimedia technology spawned a wide range of commercial instructional games. Math Blaster® by Knowledge Adventure, Inc. is a prototypical example of such a game. In essence, the software attempts to make arithmetic drill and practice appealing by embedding it within game-like activity. The central weakness of this model is that access to game

play functions as a reward for accomplishment in drill and practice—a form of behaviourist learning.

By contrast, the Statecraft X curriculum employs the game as a tool for instantiating a complex, simulated lived experience of governing so that students have a meaningful context within which to construct their personal understanding of governance and its relation to citizenship through dialogue. Statecraft X is thus a game-to-learn. In this paradigm, meaning making and identity construction are key. Students learn to be (virtual) governors in the game world. As governors, their identity is performed through their knowing–doing–being–valuing in the game world, with the curriculum’s design for learning being rooted in the transactional coupling between action and reflection advocated by Dewey (1933/2008). Learning is also dialogic. Dialogue encourages a relational approach to learning, and students are encouraged to consider, from the perspective of citizens, what their preferred model of governance is. Dialogue also promotes students’ interrogation of their virtual identity in relation to their personal identity, including their personal valuations. Consequently, students do not merely learn “about” subject matter. The design of our game and its subsequent classroom utilisation represent a marked departure from traditional pedagogies associated with educational games. Thus, our research contributes to the advancement of 21st century literacies, as advanced by Gee (2007), and the broader endeavour of educational reform, as discussed by Coburn (2003). For these reasons, our revised “shifting” model of innovation uptake is located within these spaces.

Any educational reform effort deeply questions normative practices and the assumptions underlying them. Our findings with respect to helping teachers scale the use of the Statecraft X curriculum indicate that preparing teachers to appropriate curricula innovations involves deeply personal transformations that intersect with the

core of their professional identity. Such transformations involve a difficult process of shifting from a stable, habituated practice to a reconfigured mode of enactive being. This process implicates changes to teachers' personal practical knowledge and carries significant affective undertones. Potentially, the unity of teachers' knowing–doing–being–valuing fragments during the change process. Teachers face dilemmas and conflicts in making professional and personal decisions. Although this is unsettling, it is this very disruption to existing practice that unlocks the affordances for shifting practice and reconstructing identity. Through this process, a new configuration of knowing–doing–being–valuing emerges. Given the complexity of the process, the outcome is usually unpredictable. Seen in this light, Coburn's (2003) conceptualisation of educational reform in terms of depth, shift in ownership of reform, scaling, and sustaining does not adequately grapple with the multifaceted complexity of teacher learning required for school improvement. Our research suggests that teacher professional development through reflective, reflexive guided appropriation is vital. During our post-lesson conversations with teachers, we constantly guided them as they reflected on their classroom actions and the assumptions underlying those actions, and we helped them give voice to and negotiate the dilemmas they experienced while trying to tread a fine line between an old and a new teaching practice.

Our findings have implications for theory, practice, and policy. The revised “shifting” model of innovation uptake, with its process emphasis, provides a theoretical frame for approaching efforts at pedagogical innovation and educational reform. Our research indicates that it is vitally important to support the process of teacher identity reconstruction. It also demonstrated the efficacy of approaching identity in terms of the unity of a person's knowing–doing–being–valuing. With regard to practice, our research suggests that, to be effective, teacher professional development needs to address

learning in terms of the dialectic between being and becoming. Customary one-off training workshops and seminars oriented toward filling “gaps” in knowledge and skills are inadequate. Teachers need to integrate and coordinate their knowledge and skills to the higher level of performance where they can enact the enhanced practice in an embodied way. In terms of policy, educational administrators must understand and acknowledge the challenges that teachers must navigate to transform practice successfully. A deep commitment to supporting the process from a humanistic point of view, recognising that it represents the human side of school change, is essential.

Conclusion

The uptake of pedagogical innovation in the classroom is a complex process that relies on teachers as central agents through whom change is enacted. Teachers are not passive mediators, and innovations do not simply “pass through” them. Rather, teachers are active agents, and they can also be agents of resistance. Consequently, adequate and deep teacher preparation is vital. Innovative pedagogies and technologies change the role of the teacher to that of a genuine facilitator of learning in the classroom. This change often alters power relations in favour of students and, thereby, also transforms classroom culture. A deep understanding of change processes and how to manage them is needed if innovation is to take root, be sustained, and spread throughout the entire practice of teaching and learning in schools. Our research with the use of dialogic pedagogy in the context of game-based learning suggests that teacher identity is a cornerstone of shifting teacher practice successfully. Neglect of teacher identity in educational reform will significantly increase the likelihood of innovation failure.

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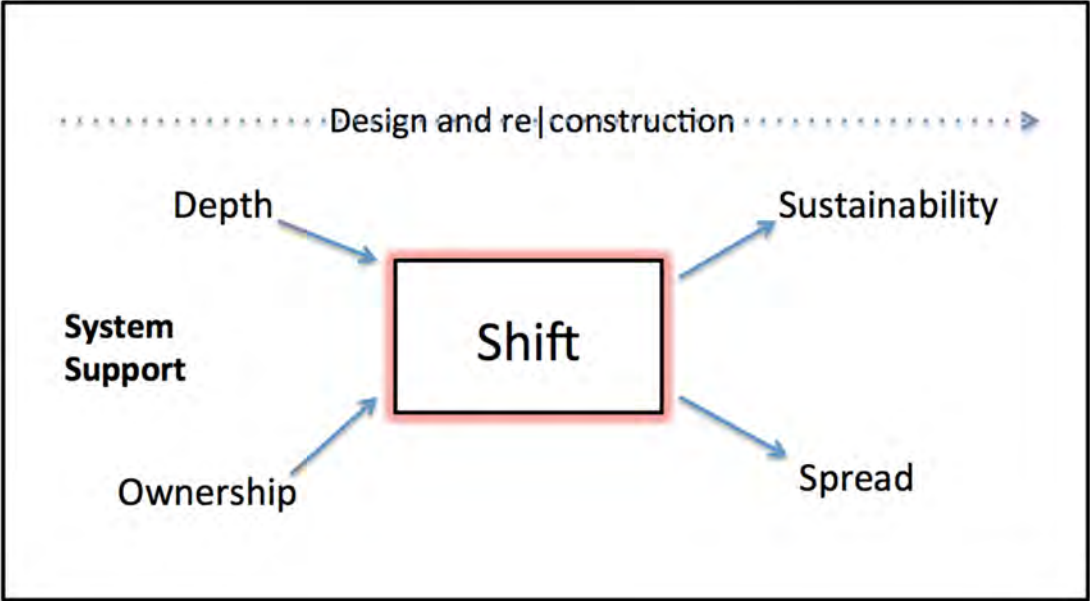


Figure 1. Appropriation model of innovation uptake.

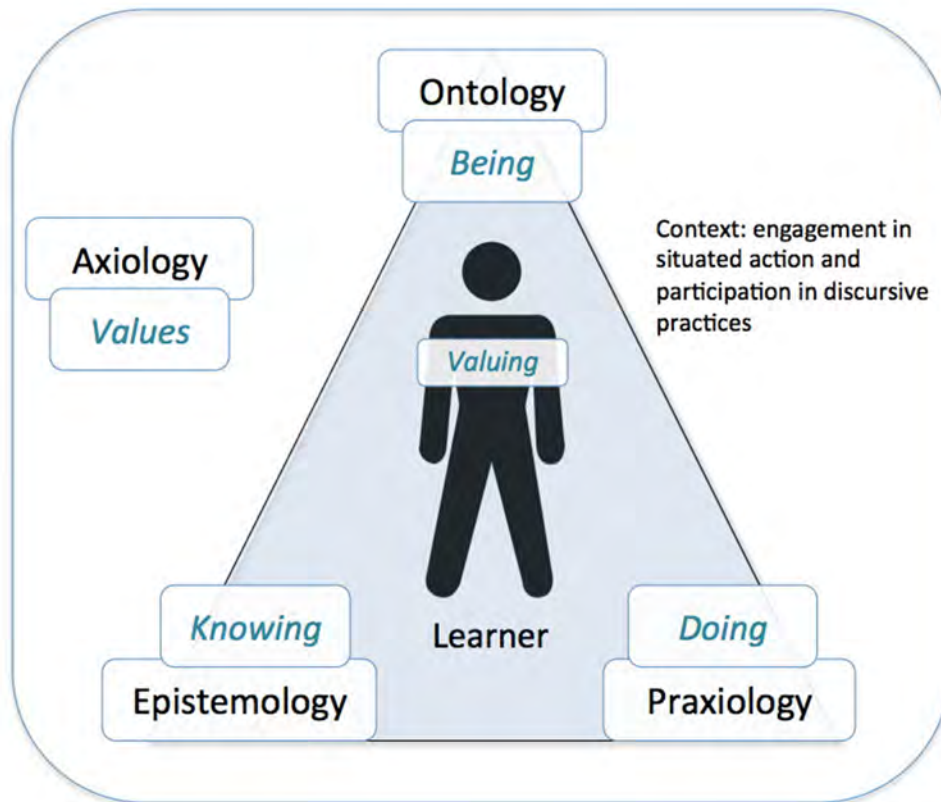


Figure 2. General framework for undertaking research on human learning.

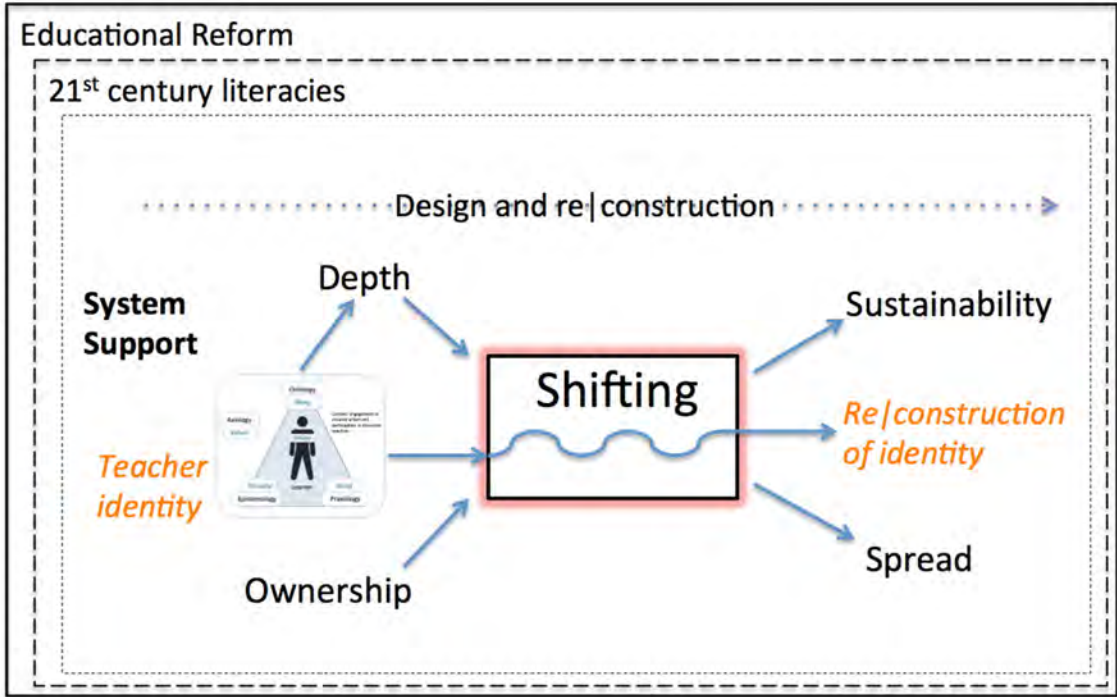


Figure 3. Revised “shifting” model of innovation uptake.