MIND, BRAIN, AND EDUCATION

University Educator Mindsets: How Might Adult Constructive-Developmental Theory Support Design of Adaptive Learning?

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ABSTRACT— This article explores Robert Kegan's adult constructive-developmental (ACD) theory. We compare these ideas to the way educators at each of Kegan's meaning-making levels might plan, implement, and assess digitally enhanced teaching activities. Using Drago-Severson's interpretation of Kegan's concepts, the authors propose that behaviors of university teaching practitioners indicate mindsets evident at four ACD levels—instrumental, socialized, self-authoring, and self-transforming. Higher education professional development literature has identified a significant gap in practitioner implementation of interactive strategies using digital tools. If university practitioners increase their mental complexity they may become more adaptive in the application of interactive pedagogies and digital technologies. Adaptive approaches might cultivate new pedagogies supporting and challenging students toward more complex and flexible qualities of mind.

The purpose of this article is to examine Robert Kegan's adult constructive-developmental (ACD) theory and its relevance to the mindsets of teaching practitioners in a university setting. A comprehensive understanding of the theory and its implications to teaching practice might assist university academic developers to implement relevant processes leading to mindful uptake of interactive digital tools for teaching in blended and online-only programs. At present, examples found in the professional development (PD) literature often take a one-size fits all approach replicating how educators approach their own teaching. Despite declarations that PD efforts are promoting, constructivist approaches many appear to be disguised forms of didactic and behaviorist teaching in the hope that a new technique or technology will resolve the complex challenges faced in the transition from face-to-face teaching to blended or online only modes (Amundsen & Wilson, 2012). Why might this be so? It would be important to know how to support and challenge university educators as they transition from traditional face-to-face teaching into blended or online-only modes, particularly as technology makes these newer models more attractive in complex educational environments. Adaptive approaches seek to expand both the individual and the workgroup ability to make changes in an inventive and collaborative manner. Appropriately planned and implemented capacity building activities might support and challenge university educators as they adjust their mindsets about the use of technology for interactive teaching.

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COMPLEX MENTAL CAPACITIES OVERCOME SINGULAR MINDSETS

Our use of "mindset" in this article refers to ways of thinking and meaning making developed over time through contextual interactions and personal relationships. These ways of

thinking set our values and standards of judgment influencing how we make decisions (Lehrer, 2009). The mindset acts as a filter, selectively shaping and limiting perceptions, cognition, and feelings, thus focusing attention on a particular line of action (Haager, Kuhbandner, & Pekrun, 2014; Mezirow, 1997). Process and product-focused activities are different traditions of engaging with information. They create different pathways in the brain resulting in the creation of different mindsets (Dweck, 2012). Kegan's stage-based ACD theory links ways of thinking with levels of mental complexity and variable mindsets (1982, 1998; Kegan & Lahey, 2009). Based on Piagetian concepts, Kegan's theory extends into adulthood and emphasizes shifts in meaning-making capacity and ways of understanding world phenomena. Kegan adopted Erikson's perspective that a person has the "capacity to unify his experience and his action in an adaptive manner" (as cited in Kegan, 1982, p. vii).

ACD is receiving increasing attention and has been applied to a variety of human activities. For example: public school leadership (Drago-Severson, 2012; Wagner et al., 2005), policymakers (Rowson, 2012), counseling (Eriksen, 2008), employee motivation (Bugenhagen & Barbuto, 2012), leadership (Helsing & Howell, 2014), cross-cultural capacity development (Lindsley, 2011), and citizenry (Mezey, 2012). However, we are unaware of studies applied to university educators and their preparation or implementation of digital technologies in teaching. This theory provides a framework for how mindsets govern our decision making; and thus, as university educators, how we might come to envision our own development and thence our university teaching as capacity building.

KEGAN'S THEORY OF ADULT CONSTRUCTIVE-DEVELOPMENT

The theory focuses on the structure and process of an individual's meaning-making system. Three basic concepts underpin this theory of increasing mental complexity:

1 It originates in constructivist philosophies where we actively construct meaning from our experiences and build a "self" through interpersonal pathways;
2 It is developmental over time and throughout the whole of life, relying on appropriate supports and challenges to achieve each level; and
3 It balances the relationship between "what we can take a perspective on (hold as 'object') and what we are embedded in and cannot see or be responsible for (are 'subject to')" (Drago-Severson, 2008, p. 37).

The following three sections explain these three ideas in greater detail.

Constructing Our Perspectives

We begin the discussion of mental development and learning with Kegan's encompassing view of "mind," "mental," or "knowing" (1982, 1998) as more than a thinking process (cognitivism) or behavioral response (behaviorism). The process of learning (mental development) is more than embodied cognition (Osgood-Campbell, 2013) and the bringing together of the conscious mind and the living brain (Campbell, 2011). "Knowing" is a personal internal construction of a lived experience linked to emotional responses that we express to an external world. It is the mental construction (synaptic network) a person creates with the sum of their biological, cultural, political, economic, and social experiences (Zull, 2011) within the context of other "knowers." "Knowing" in this manner is contrary to "the notion that our knowledge must somehow correspond to a world thought to be [totally] independent of the knower" (Glasersfeld, 2000, p. 2).

Kegan's theory (1982, 1998) of adult meaning making is a relational theory that places the thinking and acting person within complex contexts. Our biological and social beings work together to make sense of the complexity of contemporary societies (Zull, 2011). The theory reduces the dichotomy between "knowing" as either an internal construction or an external world to a relationship between these two philosophical perspectives. Based on the mental complexity theory, a capacity building framework might develop minds that are able to encompass contextual complexity. In Kegan's words, "It is about the organizing principle we bring to our thinking, our feelings and our relating to others and our relating to parts of ourselves" (1998, p. 29).

Development Over a Lifespan

Our daily lives are ruled by concepts and how we respond to them. Our concepts evolve through our lived experiences including formal and informal education—how we come to know what something is, how it operates, what it is for, when to use or not use it. More often than not, these concepts are "taken-for-granted," yet they evolve over our lifetime as we take on board new ideas and experience new events and relationships. We may be constantly changing our understanding of them over time, or we may "set" a particular perspective without realizing its impact on our thoughts and actions (Kegan & Lahey, 2009).

Subject-Object Relationships

Kegan's theory of increasing mental complexity incorporates staged transitioning where "the deep structure of any principle of mental organization is the subject–object relationship" (1998, p. 32). The process of changing one's mindset is one of managing to step outside a particular reactive point of view (subject-response) to look at the phenomenon from a

different perspective—as an object. "Subject refers to those elements of our knowing or organizing that we are identified with, tied to, fused with, or embedded in. We *have* object; we *are* subject. We cannot be responsible for, in control of, or reflect upon that which is subject" (Kegan, 1998, p. 32). Mindsets remain hidden from knowing.

For example, we each would have a subjective concept of "university." The concept has been compiled over time: what universities we might have attended, how they operated, what we liked about them, what we did not like. We would have absorbed what others said about a university education mentally linking this with how our teachers behaved; we might even have wished that things were different. All of these experiences become connected via synaptic networks fused with emotions (Zull, 2011). The mind may become *set*, establishing a personal lens through which we make other judgments about universities and the activities socialized therein. The historically compiled concept is the basis of a "subject" orientation; one that is hidden from view, yet accepted as a "truth" without question, impacting daily thoughts and interactions. It becomes embedded in our way of thinking about or approach to any task we perform within the university environment. It is the product (mindset) or package of "university," which in turn influences how we speak to others about any university issue. It is the foundation upon which we plan our approach to teaching and how we respond to students (Stewart & Khan, 2012).

The other end of the ACD theory continuum is described as being "object." "Object refers to those elements of our knowing or organizing that we can reflect on, handle, look at, be responsible for, relate to each other, take control of, internalize, assimilate or otherwise operate upon" (Kegan, 1998, p. 32). If we are to think about the concept from an "object" stance, we would mentally have to shift it from being a hidden concept, and bring it into a position where we could reflect on why we believe what we believe. We would do this for any concept whether it is a social issue or a belief about a particular practice such as the prospect of using a learning management system as a "classroom." We would have to look at it from various perspectives, dissect it, see each of its parts and examine the basic assumptions upon which it is founded. Within a capacity building activity, we might question why we believe what we believe about each "object" examining our evolutionary points of reference, and asking ourselves where these ideas might have originated.

KEGAN'S LENSES OF CONSCIOUSNESS

Kegan (1982, 1998) theorizes five stages through which humans make meaning from childhood through adulthood. As individuals progress through these stages they take increased responsibility for how they make sense of the world and their lives. As one develops mentally and engages more encompassing levels of mental complexity, one has a greater awareness of one's emotions and attitudes and how one responds to and uses the information one accesses. In this section, we leave aside the childhood level and discuss the four orders of consciousness of adulthood as described by Drago-Severson (2008). These stages—instrumental, socializing, self-authoring, and self-transforming—do not replace Kegan's preceding levels; rather, they incorporate the former perspectives and extend them toward a more encompassing way of knowing.

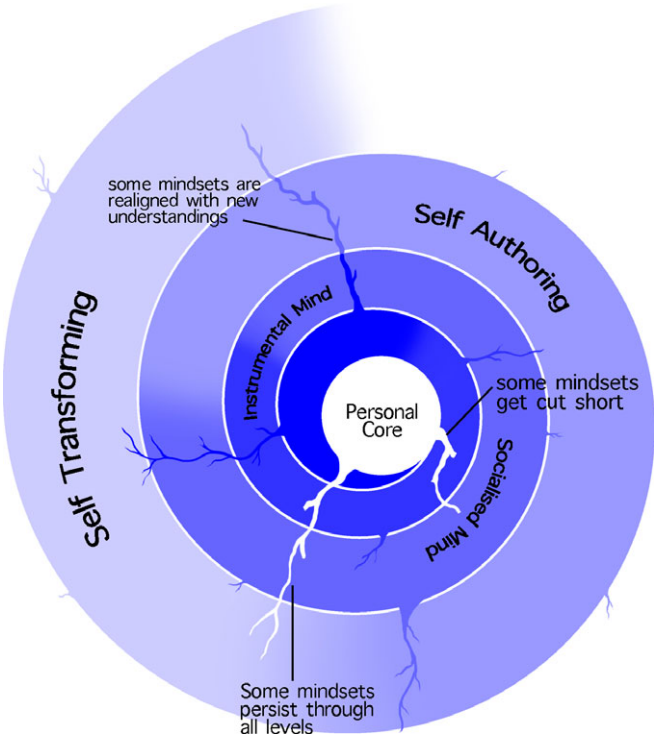

Fig. 1. Adult constructive development as an expanding consciousness with progressive transitions. Mindsets are created at various points in time and may be carried forward or may dissipate due to changing experiences and contexts.

We could liken the growth of mental complexity to the expansion of a snowball, where the first stage is the initial handful of snow arranged into a round ball (Figure 1). The next stage is building on this central core by rolling the ball in more snow (life's experiences), picking up dried grass and pebbles and other impurities from the environment. The ball attracts the loose snow expanding in size. No one can say where the ball began or how and when exactly it became more expansive. Each movement expands the whole and the "snowball" continues to grow as it interacts with the environment. As we alter our mindset we are often unable to discern the transition. Yet at other times, we can pinpoint an event or moment as being the catalyst for change. "One of the assumptions of stage theory is that meaning making

in more evolved stages becomes less rigid, simplistic and dogmatic and more flexible, open, complex, empathic, and tolerant of difference" (Caldwell & Claxton, 2010, p. 6). There is no age or automatic maturation transitions to these levels. The snowball may stop expansion at any stage. We make the transitions according to our experience and depth of knowing. Our belief is that expanded "knowing" creates humans who function more effectively in complex societies and is a foundational goal of university teaching.

Interactivity and Digital Learning

Before we move on to exploring teaching mindsets and digital learning, we would like to expand briefly on interactivity. Most effective teachers are aware that learning results from an iterative process of feedback loops; a process of asking and answering questions between teacher and students, between experts and novices, and between students, as well as questioning and finding answers ourselves. The process of observing a phenomenon, querying an aspect of that experience, and eventually symbolizing the query response into an answer suggests an interactive learning cycle (see Tinberg & Weisberger, 1998).

Highly effective teachers deepen this process of question-response-feedback between thinking and doing in order to maximize the student's learning (Figure 2). Yet, effective face-to-face teachers often find it difficult to determine how a highly interactive classroom might be replicated in a digital context. In the following sections, we describe how a university educator at each of the ACD levels might respond to the idea of using digital tools for supporting interactive student learning and assessment. In each section, the initial description of the "mind," is followed by a table identifying the interactive characteristics that might appear online. Interactive online teaching incorporates opportunities for groups and individuals to influence one another. Designing learning activities in five domains—(1) learner–interface, (2) learner–content, (3) learner–teacher, (4) learner-peers, and most importantly (5) learner-self—can foster and assist in developing contextual adaptiveness. Digital technologies make it possible for the learner to contribute directly to the educational process, linking personal goals and authentic practice. Importantly, the use of digital tools also fosters opportunities for peer and self-assessment.

The Instrumental Mind: "Rule-Bound Self"

The ACD adolescent "instrumental mind" extends into adulthood. An instrumental knower has self-management strategies, but has not yet objectified his or her needs, wishes, and interests. Instrumental knowers are subject to their desires, unable to think abstractly, and make generalizations from one context to another. They store and process

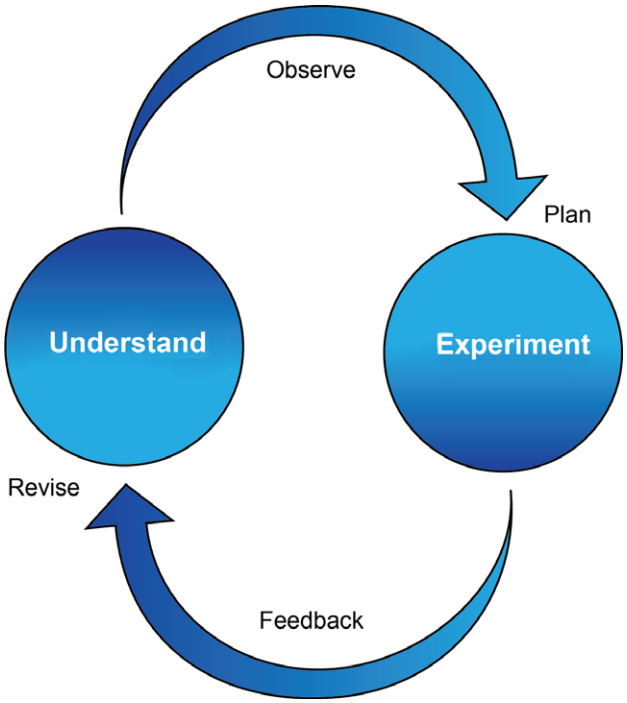

Fig. 2. The full learning cycle of thinking and doing.

the information in specific and surface ways (Biggs, 1996). They do not deduce principles, which they could transfer to other situations. They have dualistic thinking; focusing on "right" and "wrong" answers—"right" ways to think and "right" ways to act. "They generally want to learn 'the rules' whether the rules dictate performing a task as a teacher, solving a problem with team members, or helping students with homework" (Drago-Severson, 2008, p. 44). For example, when a mature-age student queries the strategies used in a postgraduate course on teaching, commenting: "Just tell me what to do so that I can tell my students," she is operating from an instrumental mindset. She has become "subject" to the idea that the university professor is the "master" with the relevant information to be transferred to students. Similarly, a university educator responding with an instrumental mind might deliver exactly the information the student has requested. In these situations, the educator maintains control of the educational process, establishing the goal and providing a pathway for surface learning. When assessing students educators might take a singular perspective on assessment strategies; requiring a highly structured cookie cutter assignment, which often require students to guess what is in the teacher's mind. When composing a course for a digital environment, interactivity is almost nonexistent (Table 1).

The Socialized Mind: "Other-Focused Self"

Socialized minds "develop the capacity to think abstractly—to think about thinking—to make generalizations, and

Table 1
Interactive Dimensions of "Rule-Bound" Online Program

Interface	*Content*	*Facilitator*	*Peers*	*Self*
Individual access to learning materials; information-based; static; interface set by "policy." Information might be made available common to classroom by controlled release (e.g., weekly blocks).	Information transfer–based. Content is defined and prescribed; does not change during delivery cycle; primarily print-based (e.g., download portable document format (pdf), PowerPoint-based lectures, or links to noninteractive video).	Teacher sets the tone, determines the goals, and creates single one-size-fits-all assessments (tests, essays, and examinations). Use of reward and penalties in marking, following school policy rigidly. Discussion forums are used as means to directly answer a student query. Teachers indicate singular response times.	No interaction between students is fostered. It may be discouraged by indicating that students should not respond to each other, fearing incorrect sharing of technical information.	Controlled release along predetermined pathway (e.g., Moodle Lesson tool).

Table 2
Interactive Dimensions of an "Other-Focused" Online Program

Interface	*Content*	*Facilitator*	*Peers*	*Self*
Static interface; objectives and assessment set by teacher; control and guided response (self-paced package).	Content defined and prescribed, additions or modifications made by teacher if and when required (change in policy or system); assessment is product-focused (quiz, report, essay, and examination).	Content prerecorded and inflexible; Discussion forums and other communication tools are available for student use, but, the teacher does not foster debate and discussion; questions often answered individually.	Group interaction without cooperative or collaborative strategies, using communication tools (blog, chat, discussion forum, and messaging).	Self is established in terms of participation as part of a group; activities are group-based and lean toward group-think; activities seek to develop group cohesion.

to reflect on their actions and the actions of others" (Drago-Severson, 2008, p. 45). Yet, they are strongly influenced by the opinions and expectations of the social milieu and culture. Educators and students operating from a socialized perspective follow the norms of their peer groups. Measures of success and achievement are aligned with the standards of the dominant group. Group work is often required without support for how to work successfully with the group members. In these situations, students are often expected to come to a consensus. "Socializing knowers avoid conflict because it is a risk to the relationship and is experienced as a threat to the coherence of a person's very self" (Drago-Severson, 2008, p. 45).

The Self-Authoring Mind: "Reflective Self"

The self-authoring mind becomes guided by personal preference and internalized values that may differ from a social or cultural environment. Emotional responses are observed, evaluated, and acted upon according to personal goals rather than to competing social norms. Persons using this level of knowing are able to exercise critical thinking, make value judgments, and resolve conflicts according to their personal perspective. They may be self-directed learners and confident in their life goals. Relationships are resolved based on a capacity to create and recreate roles, rather than simply following established demands (Eriksen, 2008). Yet, when contexts change some self-authoring minds struggle with transforming their deeply held personal frames of reference or mindsets to make sense of new experiences (Conner, 2010). Assessment at this level is often project-related. Yet, the assignment is set to reflect the teacher's dominant themes or philosophies. Students are required to make theory to practice connections related to the dominant themes. Feedback is often specific and targeted, yet focused on the "correct" thinking in relation to the content provided within the unit.

Table 3
Interactive Dimensions of a "Reflective-Self" Online Program

Interface	*Content*	*Facilitator*	*Peers*	*Self*
Learning strategy is linked to general outcome focus; self-paced with stages of release.	Content defined and prescribed, but learner additions and contributions enhance the resource base (e.g., blog, discussion forum as self-expression).	Setup online course according to own pedagogical focus; provides feedback on individual basis; assessment product focused.	Students contribute to subsequent interpretation and construction according to own perspective.	Sets own learning goals; engages in reflective (online journal, portfolio, and reflective audiovisual creations); student sets own assessable projects.

Table 4
Interactive Dimensions of an "Interconnective" Online Program

Interface	*Content*	*Facilitator*	*Peers*	*Self*
Adaptive learning space responsive to individual/group needs; contains multimodal digital elements (audio, interactive video, animation, graphics as well as text). Navigation through components of primary concern.	Uses internet as resource database; encourages student to hypothesize, manipulate, experiment, and modify content (e.g., problem-based learning, digital simulations, role-play, games, and virtual world); promotes student creation of learning content (e.g., wiki, student-created audio and video segments).	Recognize and encourage student diversity in thought and action; participate as co-researcher and co-learner. Authentic assessments process focused.	Each learner contributes actively and collaboratively to learning of others via wiki, Twitter, Skype, and collaborative concept mapping. Involved in collaborative projects problem generation and analysis become adaptive problem solving.	Sets own learning goals; engages reflectively via online journal, portfolio, personally created audiovisuals; student sets own assessable projects; works with peers and mentor to self-evaluate learning progress.

The Self-Transforming Mind: "Interconnecting Self"

As one's worldview expands, the individual begins to stand back from both her socio cultural frame and personal value system to appraise the context more fully. As learners do so, Kegan suggests that they engage a self-transforming epistemology (1982, 1998). In doing so, their sense of self is flexible to the relational context, making judgments and acting with best interests for the given situation even though it may be partial or incomplete. They hold contradictions and opposites because they recognize multiple systems existing and are "capable of evaluating their own assumptions, reframing their perspectives as needed when data indicates that their existing mindset is inadequate for the changing circumstances. They are able to handle adaptive challenges and higher levels of complexity" (Bochman & Kroth, 2010, p. 332).

Educators promoting student development as self-transformers create assignments which involve choices, explicitly related to an understanding of the contexts of the students. For example, students may choose to work in groups or individually. Students are able to choose from the choices provided or are able to come up with their own representation as long as it has been approved by the lecturer and meets the outcomes of the unit. It is assessed against the process of learning rather than just the product. For example, there may be a place where the students talk about what they learned from the assignment rather than what they got right in it. The rubric is related more to key ideas rather than particular content.

Identified in Tables 1–4, assessment becomes increasingly integrated into the learning process. We often make a distinction between teaching and assessment, yet through the involvement of peers providing timely formative feedback and self-assessment strategies, assessment becomes the bedrock of the learning process. Edwards (2012) identifies and explains this process as *teaching through*

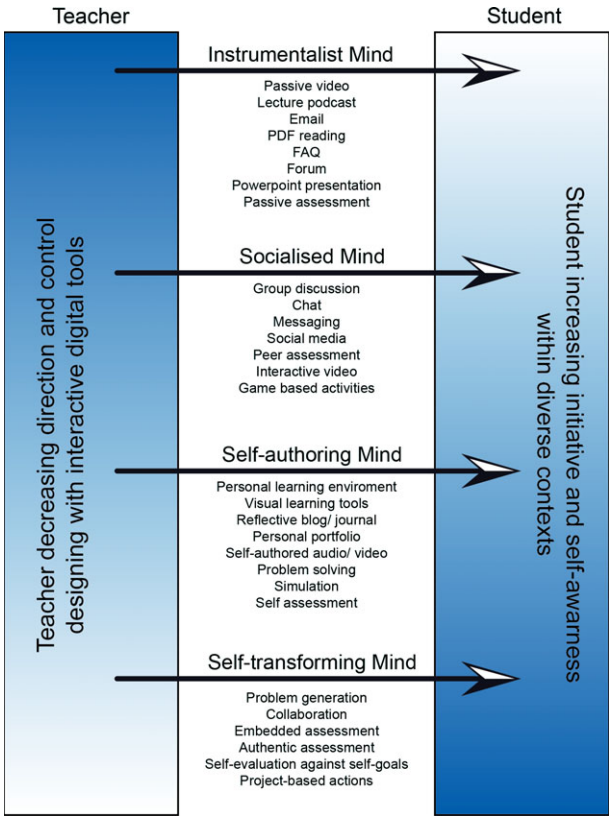

Fig. 3. Achieving deeper student self and contextual awareness through new pedagogical designs using digital technologies and reducing teacher control.

assessment (tta). The process of deepening knowledge building (Figure 3) is through careful design of activities using digital tools and new pedagogies such as embedded assessment, collaborative projects, and simulation. These strategies are supportive of differing levels of engagement and activity. They provide learners with the opportunity to establish their own learning needs and judge their achievement toward meeting these *goals*.

The progression from an "instrumental mind" to a "self-transforming mind" is similar to the concepts of surface to deep learning identified by Biggs and Moore (1993). As with the change in emphasis from teacher to learner in the classroom, so too, in the PD arena what the academic does and thinks when implementing digital tools becomes the central importance for transitioning toward self-transformative management of teaching, particularly in digital environments.

DISCUSSION AND IMPLICATIONS

Unlike many researchers of organizational learning, ACD proponents do not consider organizational systems as the source of problems and look for ways to change the system. Instead, they focus on individuals within the system and what they want to achieve through adaptive means. As a relatively new theory of learning and change, ACD theory does not have a sizable body of empirical research behind it. A great deal more time and energy might be devoted to establishing the concept of transformative development. Research indicating just how these transitions might be most effectively achieved in formal and informal education may affirm the theory as foundational and highly relevant to capacity building. Multi-method research strategies might strengthen the argument that adult constructive development is a sound theoretical basis for fostering new pedagogies. Armed with new knowledge and skills, supportive capacity building programs could be designed to challenge individuals in a transitioning process, strengthening their encompassing levels of meaning making.

It is reasonable to ask what type of capacity-building activities can be designed that encourage university educators to identify, reflect upon, and eventually alter their core beliefs—change their mindsets regarding digital literacies and the design and implementation of online learning. Certainly, if academic developers are to educate adults and promote new levels of consciousness, they must understand the conditions under which adult thinking becomes more complex and adaptive to varied contexts. As academic developers, we need to use strategies that support, rather than hinder long-term development of mental and emotional complexity. ACD theory suggests a coming together of the cognitive and affective growth of the individual, moving them toward being a person who is competent in balancing societal and interpersonal orientations, and is competent in adopting an encompassing educational perspective that involves the use of digital tools (Senge, Scharmer, Jaworski, & Flowers, 2004). Laurillard has cogently stated: "Knowledge technologies shape *what* is learned by changing *how* it is learned" (2012, p. 3). Similarly, a person's belief system and emotional responses impact what is learned, by shaping how it is learned. Thus, it is important to recognize that we are all at different developmental levels and thus need to engage with diverse supports and challenges.

Few university PD programs challenge or transform fundamental assumptions about how to provide highly interactive and adaptive learning using digital tools. Nor do they challenge the very strongly embedded concept of achievement of predetermined standards. Many programs continue to use instrumentalist strategies of summative examinations, ranking students accordingly. Such exams, very often prescribed by professional associations, often determine a student's entrance into the profession. Increasingly, research is demonstrating that achievement on exams does not determine success in one's profession. Generally speaking, employers are seeking life-long learners who

adapt to changing contexts within a self-transformative framework. Effective knowledge is important, yet it must be wrapped within the ability to evaluate any given context and make appropriate adjustments to fit the situation. Learning to adapt requires a diverse range of contextualized situations on which to build useful and transferable knowledge. As capacity builders, we may wish to engage cognitive dissonance by challenging ourselves and our students in the development of more complex ways of thinking. We might engage mindfully rather than reflexively with digital technologies to enhance student engagement in collaborative learning groups (Green et al., 2010). We would also do well to reconsider what we do that may inadvertently be cueing educators to foster disinterest in digital literacy and new pedagogies for fostering self-transformative mindsets.

Capacity building within university environments requires gestalt perspectives where change agents such as academic developers look more closely at how individual components fit into the whole of the university changing context. Such a gestalt perspective would challenge the fundamental assumptions that the process of adopting and adapting digitally engaging modes of teaching is a technical challenge that can be resolved by traditional professional development activities. If we want to foster new ways of being and living; to be innovative and maximize opportunities for more harmonious relationships; and promote flexible and adaptive solutions to contextually based educational issues and challenges, we need to use the tools available to do so. Essentially, the mental complexity theory suggests academic developers ought to emphasize the *process* of learning rather than concentrate on its *products*. Products are important, yes, but they result from the process and become adaptable through process (see, e.g., Green et al., 2013).

The predictability of much of our knowledge is context-dependent, no longer dependable, consistent, and directly applicable in our complex societies to all social and professional spaces. Our traditional strategies have focused on the acquisition of subject-specific knowledge and competencies that deepen our existing mindsets and task performance. Curricula from a new generation of university educators competent in recognizing, supporting, and challenging adult development using digital literacies will seek to expand the mental complexity of students by creating learning events that encourage students to see the world via different meaning-making systems. Reciprocally, these educators change how they interpret their own experiences and transform their own views of reality. To paraphrase Henry Mintzberg, who wrote almost three decades ago: "The real challenge in crafting strategy [teaching and learning events] lies in detecting the subtle discontinuities that may undermine a business [education] in the future. And for that, there is no technique, no program, just a sharp mind in touch with the situation" (1987). As university educators, are we ready to support the development of professionally relevant "sharp minds" in touch with the contexts in which, and for which, they teach? Humans drive change. They create the conditions for maintaining or changing mindsets, and digital tools, which can be their enabler.

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