by Deirdre Butler (2004). In her case she worked with primary teachers, so the pupils were very different. One striking feature of her work was the discussion of the effects of their work on the teachers themselves. They became much more aware of the way they related to the children. It was as though the experience changed the way they constructed the teacher-child interface. My hope is that this type of experience can form an important element in the participants' professional development and perhaps also in institutional initiatives on teaching and learning.

« 6 » Education is a complex process. In today's accountability culture where institutions are being evaluated constantly and compared on narrow criteria, collections like this set of papers celebrating 40 years of RC play a vital role in providing other broader vistas of human activity. A new European ranking system called U-Multirank allowing students to compare third-level institutions in specific academic programmes was launched in Ireland in January 2013.[1] The simplicity of the criteria used by U-Multirank is evident on their website at www.umultirank.org and will be useful to students in helping them decide which institution may suit their needs. Two of the small set of indicators used on this site refer to innovation: patents and co-publications with industrial partners. However, institutional comparisons based on such simple statistics run the risk of the traditional comparison with the bikini – what statistics reveal is suggestive but what they conceal is vital. Following Michel Serres's comments (Gash 2014: §25), many students would welcome features of constructivist learning related to innovation being included in ranking systems like this.

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Received: 18 May 2014
Accepted: 23 May 2014

1| "New university rankings launched as part of Ireland's Presidency of the EU," available at http://www.eu2013.ie/news/news-items/20130130newuniversityrankingslaunched/

Going Beyond Novelty: Innovation as a Market Process

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> Upshot • Peschl et al. argue that innovation, or the creation of sustainable change in the market, is a natural topic to be understood from a radical constructivist perspective and is similar in structure to von Glasersfeld's theory of learning. I argue that this is an accurate and interesting extension of the theory, but that their understanding of innovation needs to be extended to consider the viability of the innovation in the market. It is only in the context of the market that the innovation is perceived as novel, or that it can be understood as sustainable.

« 1 » In their target article Markus Peschl et al. take a radical constructivist perspective on learning and teaching and apply it to the process of creating innovation. They describe a course that is designed from a radical constructivist perspective in order to create an environment that is conducive to the creation of innovation. The course provides a safe environment for a team of students to create new knowledge through interaction with the "other" and to "transform [the new knowledge] into a *prototype* in the sense of understanding" (§18).

« 2 » Through this two-step process, the authors distinguish between creativity and innovation. The first step involves creativity, or specifically the creation of something new. This occurs, as Ernst von Glasersfeld argues, by the active assimilation to a cognitive structure the experiencing subject already has. The experience is perceived as novel because it generates a perturbation relative to some expected result (§5 and Glasersfeld 1989a).

« 3 » In §4 they argue that innovation is a more general concept that requires "successful application and implementation in the market or the environment." For the authors this reduces to the second step, the production of a prototype, or what they also call an "innovation-artifact" (cf. §29). While the authors do not define the nature of a prototype, it is, in some sense, an implementation or instantiation of the new knowledge.

« 4 » In my judgment these are important steps in the innovation process, but fall short in two critical places. In the words of Curtis Carlson and William Wilmot, "Innovation is the process of creating and delivering new customer value in the marketplace" (Carlson & Wilmot 2006: 4). So while Peschl et al. have emphasized that the team is creating something new, they have ignored two issues: (1) creating customer value, and (2) the challenge of being successful in the marketplace. Customer value begins with understanding the needs of the customer: What problem are you trying to solve? Why do you think your solution is new, or better? Thus, from the beginning, the source of the innovation starts with the team's understanding of the market, and the customer. There is a discipline of the market and it is that analysis that provides the perturbations in the system (cf. §10).

« 5 » For an innovation to be successful in the market, it must go beyond the production of a prototype to include acceptance in the market. The intersubjective construction of the market is similar to the acceptance of scientific theories: "[M]aintaining already established constructs invariant inevitably creates constraints for any further construction" (Richards & Glasersfeld 1979: 49).

« 6 » An innovation includes taking the prototype to market. This requires tools to analyze the market, and in this analysis there is a natural refinement of the concept. The market analysis provides insight into what can be viable in the market. And as with any accommodation, while there is only viability, the invariants provide perturbations and there will be many alternative solutions.

« 7 » In a course that I teach at Harvard's Graduate School of Education, *Entrepreneurship in the Education Marketplace*, I have adopted a similar approach to the authors, also with positive results. Students work in teams, on projects, and target specific needs in the education market. Their task is to create a business plan for a product or service that is an innovation in education. In this investigation they are given tools for analyzing the market and the competition and for designing a "go-to-market" strategy, and three-year financial projections. These

analyses provide the basis for perturbations and consequently for an iterative refinement of the product or service. The creation of a prototype is only a first step in the establishment of an innovation.

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Received: 22 June 2014
Accepted: 23 June 2014

Interacting with the Envisioned Future as a Constructivist Approach to Learning

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> Upshot • I introduce and discuss an advancement of the idea of "learning from the future" called "interacting with the envisioned future." Further, this approach is put into the context of the target article and the perspective of radical constructivism.

« 1 » In §14, Markus Peschl et al. argue that approaching an understanding of innovation cannot be gained through "projecting and extrapolating the past into the future." Instead, they follow the idea of "learning from the future" as it was proposed by C. Otto Scharmer and others.

"Learning from the future as it emerges"

« 2 » Roughly speaking, classical learning theories argue that we learn from our past experience and adapt accordingly to cope with the future (for an overview see Kolb 1984).

« 3 » Breaking with the view on learning as strictly and solely connected with our past experiences and with the belief that the future is a forward projection of the past, Scharmer (2001, 2007) and others (Greenleaf 1977; Jaworski 1998; Scharmer & Kaeufer 2013; Senge et al. 2005) proposed an alternative learning approach called "learning from the emerging future." It proposes sensing the very moment by "connecting with the source of one's best future possibility and of bringing this possibility into the now" (Scharmer & Kaeufer 2010: 25f). At its core, this is about learning "from a reality that is not yet embodied in manifest experience."[1] It is the awareness of the very moment and the observation of what is going to emerge right now that are the key elements for generating new knowledge (Scharmer calls this phase "presencing").

« 4 » However, if we consider Scharmer (2007: 52, 211, 467) carefully, it is clear that he is talking about sensing the future possibilities that want to emerge from a *present* perspective.

"Interacting with the envisioned future"

« 5 » What I want to advance in my commentary is slightly different from Scharmer's approach, though. It is not about sensing the future as it emerges, thus from a present point of view, but about reporting from a future "as-if" perspective. Or, put differently, subjects should narrate as they would already (inter)act in their envisioned future. This is done by a method that has been called "interacting with the envisioned future" (Kragulj 2014: 38f). This means using the power and flexibility of imagination that we humans have and mentally "pre-experiencing" hypothetical future scenarios and personal events (Szpunar 2010: 143). Or, as Hume puts it, it is the "[l]iberty of the imagination to transpose and change its ideas" (Hume 1958: 10).

« 6 » Using "mental time traveling" (Suddendorf & Corballis 2007), subjects actively construct and interact with a mental model based on their imagination capacity. This ability enables them to create mentally an environment that suits their beliefs and ideas. In these circumstances, we are, for instance, able to solve problems ahead of their existence. In general, it offers flexibility in novel situations. This is a "generative process" (Suddendorf & Corballis 2007: 301) of cultivating a picture of the future the subject envisions living in.

« 7 » The fundamental idea of this approach is to be somewhat detached from today's circumstances (and its restrictions, boundaries and impossibilities), which enables us to shift thinking to come up with visionary and creative results transcending current boundaries. The narrative result enhances our base of knowledge upon which we can act in the present. The focus on the active creation of an imagined future seems to be a more active way of "liberat[ing] themselves from the past ('letting go')" than is done in the target article by "enter[ing] individually into an 'empty space' of listening and opening up to what wants to emerge" (§53).

« 8 » Clearly, this approach is not about predicting the future, which is impossible. Rather, it is about adapting to and pre-experiencing a desired "as-if" scenario from which we can derive conclusions for today's acting (Jack et al. 2013) and thereby shape the future as far as possible in the individual's sphere of action.

Application

« 9 » Our "interacting with the envisioned future"-approach is distinct from commonly used scenario techniques (Chermack & Lynham 2002; Konno, Nonaka & Ogilvy 2014), which put enormous effort into dealing with uncertainty measured against a future to come independently from the actions the agent takes. These planning techniques and their relation to constructivist learning theories have been discussed by Thomas Chermack and Louis van der Merwe (2003).

« 10 » Our strategy has a different emphasis. It is a method for explicating tacit dreams, wishes, desires and so forth as if they had become true and thereby generating a picture of the desired personal future from which knowledge can be derived in order to act accordingly in the present.

1| Cf. Scharmer's presentation "Presencing: Learning from the future as it emerges" at the conference "On Knowledge and Innovation" in Helsinki, Finland, in May 2000, available at www.ottoscharmer.com/docs/articles/2000_Presencing.pdf