Spaces for entrepreneurship: From education to incubation

Jochen Schweitzer

University of Technology Sydney

E-Mail: jochen.schweitzer@uts.edu.au

Natalia Nikolova

University of Technology Sydney

E-Mail: natalia.nikolova@uts.edu.au

Melissa Edwards

University of Technology Sydney

E-Mail: melissa.edwards@uts.edu.au

Joanne Jakovich

SOUP Labs, Sydney

E-Mail: jojakovich@gmail.com

Introduction

About 8 out of 10 CEOs of the top organisations worldwide foresee that their biggest challenge for the future is to deal creatively with risk and uncertainty (IBM, 2010). Increasingly, and because of such challenges, current management practices have become the focus of significant criticism, particularly in relation to poor theory informing poor practice (Ghoshal, 2005; Pitsis & Clegg, 2007). Accordingly, there is a need to innovate the ways in which we deal with complex problems to meet the challenges of the future.

Little is known so far what 'ingredients' stimulate entrepreneurial activity. While existing research sees creative problem solving as a dynamic, complex and subjective process

taking place in a stimulating social environment, we do not know much how we create the conditions for the flourish of this process. In particular, as Edenius et al. (2007: 207) argue, "most previous research assumes that spatial orderings of things and people are merely part of the background that does not intervene in the learning process. Rather, the concern has been with the relation between learning and processes of interacting, working together, sharing tools, story-telling and narrating".

In this study we seek to close this gap by exploring elements of entrepreneurial spaces that stimulate creative thinking and doing. More specifically, we seek to understand how physical spaces spur emergence of innovation and entrepreneurship. Our insights are based on three empirical studies involving graduate and postgraduate students, academics and business professionals from different disciplinary backgrounds who were given the task to develop creative and entrepreneurial proposals in response to complex social issues, such as waste, traffic congestion, and urban sustainability. Their interactions took place in two spaces purposefully designed to stimulate creative and innovative thinking and acting. A subset of the workshops and entrepreneurship sessions we studied were open for the public to join. We compare such open, flexible and porous spaces allowing for opportunities of serendipitous collaboration to more contained spaces and discuss implications for the design of entrepreneurial work environments.

Theoretical Background and Gap

In 1997, Tyre and von Hippel argued that while research on creative thinking and entrepreneurship has concentrated on emphasizing the importance of communication for successful problem-solving and knowledge creation, the importance of the physical setting for these processes has been nearly overlooked. "People's usable skills often depend on their physical settings because people act skilfully by using specific machines or tools, by interpreting physical cues, by exploiting their intimate knowledge of local idiosyncrasies, and by responding to stimuli embedded in a specific context" (p. 73). Therefore, seeing, touching and manipulating objects is often as important for improving understanding as hearing and explaining. Edenius et al. (2007: 194) also point out that to understand organizational learning, we need to study the visual, perceptual model of a given work place. They argue that in existing research on learning, "space has mainly been associated with the aural (auditoryoral) medium, emphasizing talking and listening, overlooking other salient bodily features such as seeing, looking, gazing, glancing, contemplating, scrutinizing, gesturing and

moving in specific ways." Accordingly, learning has been associated with communicative speech acts ignoring such activities as 'seeing', 'perceiving' and 'moving' in a spatial, physical environment.

Recent research shows that there is a growing understanding of the importance of space as an enabler of creativity and that the work space as a place for emergence of entrepreneurial or creative thought needs to be designed differently than "normal" work places. Kristensens (2004: 89) agues that "creativity takes place in a physical context, i.e., in a confined space" and that the framing of this space stimulates or inhibits creative thinking. Moultrie et al. (2007: 53) point out that "the spaces in which creative and innovative activities take place are an important part of the innovation process in an organization". Brown and Duguid (1991: 47) stress that "students engaged in entrepreneurial learning can in one way or another be seen to construct their understanding out of a wide range of materials that include ambient social and physical circumstances" (citation in Pittaway 2007: 213—check original). Magadley and Birdi (2009: 315) discuss the advantages of innovation labs as "dedicated physical environments or facilities with collaborative work spaces in which groups and teams of employees can engage with each other in order to explore and extend their thinking beyond and above normal boundaries". They suggest that spaces designed for fostering creativity have a different physical layout, a range of high- and low-tech supporting tools, and expert facilitators (see Moultrie et al. 2007) and show that such spaces have a positive impact on creativity and on participants' attitudes towards it. Zitter, *et al* (2011) refer to the difference between designable elements of the learning environment, including spaces, on a scale from highly specified to highly emergent. They claim that adaptive elements which are left open to be specified by all participants, are necessary in an emergent environment so as learners do not feel overwhelmed by the lack of structure. Accordingly, spaces can represent adaptive elements of learning environments when they are open to be designed and specified by their users. This is in line with research that has stressed that spaces should be seen as constructed by their users (e.g., Kornberger and Clegg 2004; Edenius et al 2007).

From Magadley and Birdi (2007: 316): While the design of innovation labs is idiosyncratic to the funding establishment, many share common features (see Lewis & Moultrie, 005, for a review). Most conspicuous is the physical layout or the structural configuration of these centres. Examples of these features include rooms with curved walls, multiple working rooms, round tables, exhibition spaces and refreshment areas. These have not been designed arbitrarily, but rather diligently put together to create a space conducive to group creativity. It has long been argued that the architecture, décor and layout of a physical

space have a crucial influence on occupants' behaviour (Holahan, 1982). These centres aim to encourage 'out-of-the-box' thinking by eliminating the traditional environment, such as rectangular rooms and tables (Lewis & Moultrie, 2005).

Building upon insights from these works, we designed two spaces in order to study their influence on learning and creativity. The two main elements of these spaces are: First, they are inclusive, rather than exclusive; they are specifically designed to invite outsiders to become insiders, i.e. to participate in the work happening, as well as to stimulate insiders, i.e. the participants, to seek interactions with outsiders. Second, our spaces are open and flexible; our aim is for the participants to perceive them as 'tabula-rasa', as a clean space they could design and re-design according to their needs. Based on these innovations in the design of learning spaces, the aim of this paper is to explain the influence of the spaces on working practices and creativity.

Methodologically, our study utilizes not just discursive materials when studying the space and its influence on creativity. Rather, we also filmed our participants and their interactions with and in the space, and made a large number of photographs of the spaces at different stages of the projects providing rich and more perceptually enhancing material (cf. Edenius et al. 2007).

Approach and Method

We report on and evaluate a process of creative problem solving delivered through a purposely-constructed entrepreneurial space and program. We explore preliminary findings of three pilot studies that are part of a larger study. We completed three pilot projects: (1) a 'Creative Minds' workshop (CMW) consisting of four sessions with a mix of undergraduate students and academics that were invited to tackle the problem of excessive consumption. Participants were selected from various disciplines in order to achieve a maximum diversity in knowledge and skills; (2) ten weekly one hour problem solving sessions with students, academics, business and community members who were invited to group spontaneously and address current urban issues; they had to come up with solutions within this one hour (we call these biketank sessions); and (3) a series of workshops involving postgraduate students who met every week for 13 weeks to develop entrepreneurial business proposals to the use of an innovative mobile technology (we call these e.lab sessions). All participants took part

voluntarily and were invited to engage freely with other participants and develop ideas that would invoke action towards social change.

The CMW and the biketanktank sessions were enacted in a warehouse space purposely designed to enable and encourage multiple modes of interaction and movement. It was set outside the university grounds, and provided open access to the neighbouring streets. The space was empty when we took it over, and we had the freedom to custom build furniture and design the spatial layout (this freedom was only restricted by the limited financial resources we had available). We later transferred our insights from the use of the warehouse to a new space, which was to host the e.lab sessions. This space was originally planned to be a commercial coffee shop, and again, it was empty when we moved in. We transferred some of the furniture from the warehouse to the new space, and bought a few new pieces. This new space was, similarly to the warehouse, set at the outset of the university grounds next to a busy public walkway and accessible for passers-by to come in and have a look. Thus, both spaces were open to the outside, were large allowing lots of movement, were different from a typical classroom and were empty, which allowed academics and students alike to experiment with their use and design of the space as discussed later on.

We adopted a mixed-method approach incorporating a variety of information sources. The first two projects were visually documented to study the processes that enabled creative problem solving and how participants utilised the space in this process. We filmed all sessions, often using two cameras: one to film the whole space and the movement and interactions from a wide perspective, and the second to film how individual participants or teams were working and using the space to capture details that were not apparent from the wide angle perspective. This resulted in more than 20 hours of raw material, which was then edited into a 15-minute documentary. We also video-documented the interviews with participants and took a large number of pictures of both spaces during different stages of the projects, which visualize how the spaces were transformed and re-designed (we have a total of more than 400 photographs). In addition, the second, third and fourth authors who participated in different stages of the projects made detailed notes after each session they observed, which were used to describe how the participants interacted with and in the space.

The third project was document through the participant observation of the second and fourth author who facilitated students' interactions. During the 13 weeks, the researchers made notes on the patterns of interaction they observed and the use of the space. In addition, we conducted detailed surveys and a focus group discussion with the participating students.

Data analysis followed what Corbin and Straus (2008) refer to as a grounded theory framework, which is an open-ended discovery of emerging themes. We started with a detailed interpretation of the video materials, the field notes and interviews. We paid special attention to the way our participants use the space: in which areas did they perform what activities, how they moved around the space, where did formal and informal discussions take place, how did they use the provided materials. We also made notes on their emotions while observing their work as well as the visual material aiming to find their emotional responses to the space, and which elements of the spaces were sought in different emotional states.

The warehouse space

Participant observation on the warehouse space (from u.lab book 1, p. 26)

When we were planning the CMW, Biketank and e.lab workshops, we needed a physical space. Belonging to a university means we have access to a wide range of classrooms and lecture theatres and all sorts of specialised laboratories. But these spaces come with constraints. Being shared by so many users, they are necessarily generic, and there are preconceptions of what activities can and cannot, should and should not take place in there; and they have to be pre-booked in regular timeslots. In contrast, we wanted a place for freedom and experimentation, where our participants can define their own rules of engagement. We took a raw and malleable empty warehouse that was flexible and adaptable so that it could be shaped to suit a variety of activities. We then bought and custom build furniture that encourages collaboration, participation and a diverse set of activities: long tables, tall and short tables, bar stools and chairs. We brought in a large number of foam cubes that could be used to create small spaces, such as one resembling an elevator so our students could practice an 'elevator pitch' of their ideas, or as temporary walls. We provided plenty of boards and flipcharts to write on and stick things on. We also created a space to relax, chill, and to gather round for team presentations and pitches. It had comfortable couches, a fridge, a projection and a whiteboard surface – sometimes the best ideas come when you take a break. In fact, the purpose of this area was not so much about taking a break, but providing a different zone within the larger space to allow the brain to switch gears. We provided a rich set of prototyping materials, which were reused and recycled wherever possible. There were materials to provide rigid structures and foundations of all shapes and sizes; things that bind other things together; things to mould and bend into random shapes; things that are colourful and fluffy. We also brought in a toolbox, filled with tools for

prototyping, including scissors and craft knives; pliers for bending; hot glue guns, and more. In addition, we organised some interesting, warm and quirky lighting, including some film set lights.

As we were the sole users of the space during the workshops, our participants could leave their work for their next session without the need to pack or move anything. Thus, once they started using the space, it quickly filled with prototypes and models, boards of post-it notes and masses of brown paper covered in ideas. The idea was to leave everyone's work on display for everyone else to get interested.

Visual documentary analysis of the use of the warehouse space

In creating this space, our intention was to make it flexible and easily manipulated so it can be used as a tool that can energise creative processes by encouraging specific behaviours, and as a representation of the activities taking place in the space, i.e. ideation, testing, iterations of new prototypes and communication of outputs. The visual documentary offers rich insights into how the participants utilized the space, used the process and method and generally, interacted with each other and with external actors, such as academics, experts and the public throughout the duration of the sessions. We now provide a summary of our insights based on our interpretation of the visual material.

The visual data demonstrated the flux and movement in the work space that was devoid of the usual expectations of a classroom setting. Three deliberate spaces indicated the modes of engagement; a stage with screen and lounges for formal pitches and discussions, lounges for sharing food and conversation and a workshop space for action, iteration and prototyping. Observations of the visual data demonstrated how the open space allowed movement and interaction and signalled the message of 'no boundaries'. This allowed students to move around and interact spontaneously with students who were not part of their team, academics and visitors. Participants played with the provided tools and equipment stimulating the 'inner child' to physically explore and express ideas. We observed students, academics and professionals engaging in playful interactions. Set outside of the university grounds, the warehouse served as an interface between academia and the community. In contrast to other innovation labs, the open doors of the warehouse attracted passers-by and enabled participants to immediately test their ideas in the community. This openness further signalled to participants that they were encouraged to spontaneously engage with others who

were not formally participants. Such approach greatly stimulated a network-enabled type of collaborative creativity, groupthink and entrepreneurship.

The new space

After the first set of workshops, we had to vacate the warehouse and were offered a new space that was newly created and was planned to host a commercial coffee shop. Taking over this space allowed us to design it based on our insights about what worked in the warehouse space and what didn't. The biggest change we made with the new space was to not pre-design specific areas for specific activities but to let our participants decide how to use the furniture we supplied, where to position them, and what different areas they needed. Our students could quickly create a lounge space to eat and relax, change it to several workshop spaces, each with their own working table and a whiteboard for each team to work, or create a presentation area when pitching their work. The flexibility of this space was further increased by granting students their own keys to the space so they could use it whenever they felt the need to, including on weekends.

Analysis of the focus group discussion on the new space

The focus group interview revealed that students highly appreciated the flexibility of the space, both regarding its modular furniture and its access. They liked to move around to different areas, and to create their 'own' spaces for different types of work; the openness of the space and the natural light made it a pleasant space to work in, which combined with the music they liked to play in the background, gave it a very relaxed and informal feel. The openness of the space to outsiders gave a feeling of being part of the environment rather than being disconnected and shut away as in a typical classroom or innovation lab. For some students, this openness was slightly intimidating at the start, as they felt 'exposed'. Being used to the protected mode of a typical classroom setting, they needed time to get used to it. Other, however, embraced the openness and felt stimulated through the movement, the colours and the noise of the busy outside.

Participant observation on the use of the new space

A number of additional observations emerge from the research notes.

"On your feet" – standing, not sitting: We provided working tables that we designed to work standing or sitting on an elevated stool. While most students started their group work gathered around tables in a sitting position, over time and with increasing activity we observed most teams changing to a standing position. Students moved around the table and assumed different positions to interact with teaching materials or jointly develop and discuss ideas and concepts. For example, when asked to quickly create a prototype of an idea, the group that was standing was also the first to grab prototyping materials and tools from across the room to start building. Also, when asked to present an idea as a role-play, standing teams were first to quickly find props and other accessories in the room to change into role-play characters. Being "on your feet" while working creatively allowed students to quickly act upon their ideas and find ways to express ideas, share ideas, show and tell or convince group members.

"Inspiring objects": Prototyping materials and random objects are scattered around the work spaces. Over time, and resulting from various sessions the space had filled with artefact of creative thinking, prototypes and other random items, like toy skateboards, LEGO people, an alarm clock, a piece of carpet, a tea cup, etc. Materials are kept in large open boxes, which are accessible for everyone to explore. We observed how single items would find their way onto a group's table and initially encourage rather unrelated play amongst team members but incidentally spur an ideation session and inspire the ideation process. For example, coffee mugs inspired the inclusion of a mobile café service for an urban planning concept, a belt inspired the naming of a "go to market" strategy, a bicycle was used to represent the idea of mobility, etc. Sometimes objects would be kept by a team over several sessions and used various times. For example, one team used the rubber cover for a mobile phone to hold cardboard cards, which they had created to prototype different interfaces of a mobile phone app. Another team frequently engaged in decorating stools by painting them or adding drawings and script while also developing concepts, working out details of a business proposal or discussion teamwork and progress. Such playful interaction with surrounding objects and materials generated a "free spirit" atmosphere where restrictions were challenged and the brief was questioned frequently.

We observed emotional responses to the various activities and challenges during the course of the CM, e.lab and biketank sessions.

Excitement could be observed after teams had finished a convergent design phase where decisions were made, details were decided and next steps became clear. Then student would launch into activities including further data collection, ethnographic research, prototyping etc. Similarly, in divergent design phases, where ideas were suggested, options were explored, and different ways forward were being discussed. However, these phases also created moments of *frustration* amongst students, since making design decisions often entailed overcoming team conflict and finding common ground, agreeing on the interpretation of research findings and translating insights into design features. Other sources of frustration were group dynamics, time pressure, and high levels of uncertainty in perceiving the design context. The spatial set-up would cater in different ways for students to cope with such varied emotional responses. For example, the open and flexible nature of the space and work arrangements allowed students to "take a break" at any time. We observed teams changing from the workspace area to the lounge area to relax and "think things over again" while having a cup of tea or sharing food. We also observed single students seeking solitude by going for walk outside. With increasing awareness of the design thinking and creative problem solving processes amongst students we also observed how teams would prescribe themselves an inspirational break, or an energizing activity. One students went out on short, random bike rides around the block to release energy and come back refreshed, while others would start any of the stoker activities (like clapping games etc.) that they had learned in earlier sessions. Again, the availability of space inside and outside the lab, as well as an accessible outside and provision of materials and objects (balls, rope, etc.) allowed for unrestricted release of tension and recuperation of balanced energy levels within teams and the overall group.

Summary of insights from both spaces

Reflecting upon how our workshop participants designed, played with and experimented with these two spaces, it becomes clear that the participants co-created the spaces. When we were envisioning the use of the spaces, we were thinking about the needs of the participants as well as how to give them the freedom to experiment and play with the spaces and their features. Our data reveals that the participants quickly embraced the flexibility of the spaces and started viewing the spaces as 'their own'. They spaces became their playground in which they could be loud, active, and creative. What was different from other spaces used in innovative

organisations was that our spaces were working areas, a meeting space, a presentation space, a relaxing space, a supply room (with all the materials to be used openly displayed on wall shelves), and an eating space at the same time. There was no separation, not even glass walls to separate sections or stop the noise. The participants could see what everyone else was doing, observe their interactions, their movements, their prototypes. Moreover, the openness of the spaces allowed the participants to observe what is happening on the outside (more so with the second space that was open towards a busy walking area). Visually, they were exposed to a lot of 'distractions' that in our case seemed to stimulate their creativity rather than creating a problem. This openness and flexibility of the space allowed for a maximum interaction and collaboration between the students. Our students confirmed that the space stimulated not only in-team collaboration but also the between-team collaboration as everybody could see and hear what other teams were doing. In many cases, teams helped each other with materials and ideas.

The round-the-clock access to the second space proved to be another feature that stimulated collaboration. We saw that the second space was quickly embraced by our students as an area they wanted to be in. Many of them came to work even on weekends. Thus, the space became 'sticky'. It was even used as a party space by our students at the end of the semester.

Discussion and conclusion

As Edenius et al. (2007: 201-202) argue, a "seemingly chaotic setting heightens the senses, making it difficult for the employees to concentrate and engage in deep thinking. Employees are constantly exposed to various environmental stimuli. There is no time to think; problems are discussed and decisions are made impulsively. Because this design promotes verbal interactions and the free flow of communication, silence is unbecoming. Less verbal members are suspected of being unwilling to share knowledge, of withholding information."

"In this open visual space, incumbents felt completely exposed. To the extent that everyone could see everyone else and was seen by everyone else, individuals perceived themselves to be in the 'centre of events', actively participating in whatever was going on around them." Edenius 2007: 202). Visibility is a central variable for the interpretation of the physical work environment (e.g. Stryker & Farris, 2004), and in particular for the perception of others and their activities within that environment. Workstation visibility was empirically found to be

promoting both team communication and in inter-team interaction (Stryker & Farris, 2004). Seeing each other allows for assessment of the other's engagement in activities and the opportunity for personal interaction. (Haner 2005: 293)

Multipurpose use of the space stimulates maximum collaboration, similarly to the 'non-territorial office' (Allen, 1977 in Kornberger and Clegg 2004: 5).

As Kornberger and Clegg (2004) argue, buildings and spaces can be sources of control, or negative power, or of creativity, or positive power: "Power through buildings is exercised through the way people are defined as different kinds of members and strangers; in the way that they meet; through the control of the interface between inhabitants and visitors; through the location of persons and things; and through control of their paths of movement and visual, acoustic, and communicative paths (Markus 1993: 96, cited in Kornberger and Clegg 2004: 1104). By giving our participants the freedom to design and re-design the space according to their needs, the space became an expression of their creativity, a materialization of the positive power of play and creativity.

From Kornberger and Clegg (2004): "As Horgen et al. (1999: 197) observe, 'The ambiguous, incomplete work environment seemed to lend itself to tasks of collaborative inquiry in which problems were unclear and needed to be framed and where data were being explored whose meanings were as yet unclear.'" "Such spaces are capable of transforming themselves while being (ab)used and occupied by different people only temporarily".

In this paper we explore how entrepreneurial work environments can be designed to encourage creative emergence. We provide empirical evidence of three pilots that highlight the significance of space to the emergence of creativity. In our research we have designed what Zitter *et al* (2011) define as a 'highly emergent' learning environment. While the underlying process was sequential, it was iterative and porous enabling learners to move freely and at their own will back and forth between creative stages and spaces. Similarly to Zitter *et al.* (2011) we found that adaptive elements of the learning environment are essential, however our study differs in that our approach to the sequential design process is more porous and emergent. We claim that emergent learning environments are appropriate where industry professionals and academics work closely with students, and such environments could be

replicated by organisations wishing to engage creatively with customers, suppliers and the community.

References

Boland, R., & Collopy, F. (2004) Managing as Designing: Stanford University Press.

Boni, A.A., Weingart, L.R. & Evenson, S. (2009) Innovation in an Academic Setting: Designing and Leading a Business Through Market- Focused, Interdisciplinary Teams, *Academy of Management Learning & Education*, 8(3), 407–417.

Burry, M.C. (2005) Homo Faber. *Architectural Design: Design Through Making*, 75(4), 30–37.

Chiles, T., Tuggle, C., McMullen, L., Bierman, L. and Greening, D. (2010) Dynamic creation: Extending the radical Austrian approach to entrepreneurship. Organization Studies 31(1): 7-46.

Corbin, J M and Strauss, A L (2008) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks: Sage Publications.

Dunne, D. & Martin, R. (2006) Design thinking and how it will change management education: an interview and discussion. *Academy of Management Learning & Education* 5, 512–23.

Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D., & Leifer, L. J. (2006). Engineering design thinking, teaching, and learning. *IEEE Engineering Management Review,* 34(1), 65-92.

Ghoshal, S. (2005) Bad Management Theories are Destroying Good Management Practices. Academy of Management Learning and Education 4(1), 75–91.

Gibb, A. (2011) Concepts into practice: meeting the challenge of development of entrepreneurship educators around an innovative paradigm: The case of the International Entrepreneurship Educators' Programme (IEEP), *International Journal of Entrepreneurial Behaviour & Research*, 17(2), 146-165

IBM (2010) Capitalizing on Complexity, Global CEO Study.

Isaacs, W. (1993) Taking Flight: Dialogue, Collective Thinking, and Organizational Learning. Organizational Dynamics, 22(2), 24-39.

Jack, S.L. (2010) Approaches to studying networks: Implications and outcomes, *Journal of Business Venturing*, 25, 120-137.

Jehn, K., Northcraft, G. & Neale, M. (1999) Why differences make a difference: A field study of diversity, conflict, and performance in workgroups. *Administrative Science Quarterly,* 44, 741-763.

Magadley,W. and Birdi, K. (2009) Innovation labs: An examination into the use of physical spaces to enhance organizational creativity. Creativity and Innovation Management 18(4), 315-325.

Martin, R. L. (2009) The Design of Business: Why Design Thinking is the Next Competitive Advantage. Harvard Business School Press.

Mathieu, J., Goodwin, G., Heffner, T., Salas, E. and Cannon-Bowers, J. (2000) The influence of shared mental models on team process and performance. Journal of Applied Psychology 85(2), 273-283.

Messner, M., Kornberger, M., & Clegg S. (2008) Critical practices in organizations. Journal of Management Inquiry 17(2), 68-82.

Moultrie, J., Nilsson, M., Dissel, M., Haner, U., Janssen, S. and Van der Lugt, R. (2007) 'Innovation Spaces: Towards a Framework for Understanding the Role of the Physical Environment in Innovation'. *Creativity and Innovation Management*, 16, 53–65.

Nussbaum, B. 2005. "Getting schooled in innovation". Business Week Online.

Parkhe, A., Wasserman, S., Ralston, D.A. (2006) New frontiers in network theory development. *Academy of Management Review,* 31 (3), 560–568.

Pelled, L., Eisenhardt, K. & Xin, K. (1999) Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly,* 44, 1-28.

Pitsis, T. & Clegg, S. (2007) Interpersonal Metaphysics -"We live in a political world": The paradox of managerial wisdom. In E. Kessler & J. Bailey (Eds) Handbook of Organizational and Managerial Wisdom, Sage: Thousand Oaks, 399-421.

Schein, E. (1996), Three cultures of management: The key to organizational learning. Sloan Management Review, 38(1), 9–20.

Schutz, A. (1967) The Phenomenology of the Social World. (Translated by George Walsh and Frederick Lehnert.) Evanston, IL: Northwestern University Press.

Star, S. and Griesemer, J. (1989) Institutional ecology, 'translations,' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-1939. Social Studies of Science, 19, 387- 420.

Starkey, K., & Tempest, S. (2009) The winter of our discontent: The design challenge for business schools. Academy of Management Learning & Education 8(4), 576-586.

Teal, R. (2010) Developing a (Non-linear) Practice of Design Thinking, *JADE,* 29(3), 294-302.

Ungaretti, T., Chomowicz, P. ;Canniffe, B.J, Johnson, B., Weiss, E., Dunn, K., & Cropper, C. (2009) Business + Design: Exploring a Competitive Edge for Business Thinking, *S.A.M. Advanced Management Journal,* 74 (3), 4-11.

Weick, K. (1989) "Theory Construction as Disciplined Imagination. *Academy of Management Review*, 14, 516-532.

Zitter, I., De Bruijn, E., Jan Simons, P.R, & Ten Cate, T.H. (2011) Adding a design perspective to study learning environments in higher professional education, *Higher Education*, 61:371–386.