
Design methods as disruptive process in delivery of a business school curriculum**Noemi Sadowska & Dominic Laffy**

Regent's University London, Inner Circle, Regent's Park, London, NW1 4NS, UK.

sadowskan@regents.ac.uk laffyd@regents.ac.uk

Abstract: In a recent article of Co.Design, Quinn (2012) describes the Rotman Design Challenge as a 'commendable experiment by the school's Business Design Club to expose MBAs at the University of Toronto's Rotman School of Management to the value of design methods in business problem solving'. The call for a meaningful reinvention of both design and business education so that the business world can realise the true value of design thinking is not new. At the 2009 European Academy of Design (EAD) conference in Aberdeen, Scotland, the authors of this work presented a paper identifying the same points but from the perspective of a business school's educational paradigm. These authors believe that the change does not have to be a radical overhaul of the educational system in business and design but, rather, a more disruptive process from within where focus on innovation can provide a common platform for both business and design education to exchange methodologies. In design education, reliance on artefacts as teaching tools and critical analysis of the design process is standard practice, but this is not always the case in business education. This paper investigates the impact on business students of designing an artefact in the process of innovation as part of their ability to generate new ideas, empathise with users and reflect on process. The paper draws on observations of students' engagement in the process of innovation, substantiated by students' reflections on their own development and insights from staff delivering the module. It also draws on the artefacts created by the students. The methodology underpinning the research stems from participatory action research. The aim of the paper is to demonstrate how well-established techniques from design education can be used as disruptive processes within business education to craft innovation education in a business school environment.

Keywords: Business; Design; Education; Artefacts; Disruptive process.

Biographies: Noemi Sadowska was an agency designer in Germany, launched her own design studio in London, and is now a Programme Director with extensive experience in HE curriculum delivery, development and launch, teaching reflective writing, strategic design, creativity and design complexity, as well as supervising dissertations. Her research is focused on learning experiences that occur when business management and design management intermingle and intersect. Dominic Laffy has taught at several academic institutions, including over twenty years at Regent's University London. His career started in engineering and information systems in the radar, security and management consultancy sectors, and he now teaches predominantly on strategy and services marketing. His research is primarily in Strategy Dynamics, and he has co-authored conference papers for the EAD.

Contents:

Abstract

1. Introduction

2. The broader context

3. Methodology

4. The role of the mock-up in innovation curriculum in a business school (2008 to 2013)

5. Conclusions

6. References

Word count: 6,034.

I. Introduction

Since 2008, the authors have been delivering a final year elective module entitled 'Managing Strategic Design' to business students undertaking a BA (Hons) in Global Management at Regent's University London. This module has been designed to challenge students to develop truly innovative business opportunities, drawing on design and strategic thinking. In 2009, in order to develop our teaching and address some of the complexities of this module, we instigated a research project stemming from the key issues illuminated by the curriculum delivery. The project initially focused on relationships between business and design that lead to new business opportunities. From the start we argued that it is not enough to expose employees to this relationship in the context of their employment. Rather, this exposure needs to take place prior to entering the employment market, at the point of business education. Thus, we have maintained that with greater integration of design into business contexts, there is a need to embed design thinking within business education. However, we believe that this process does not have to be the result of a radical overhaul of the educational system in business and design but can occur through more of a disruptive process from within where focus on innovation can provide a common platform for both business and design education to exchange tools and methodologies.

Curedale (2012) argues that although 'traditional design education has cast a designer as a type of artist who essentially works alone and places personal self expression above all else...' in reality design methods and processes a very much part of the complexity of the projects they contribute to. 'The methods stress design as a collaborative activity where designers respect and have empathy for the other development team members and where design is informed by an understanding of the perspectives of the people who will eventually use the finished design' (Curedale, 2012). In recognising the potential of design methods in contributing to business management education, we have focused on the role of an artefact, as represented by a design mock-up, in the process of developing truly innovative business propositions. In design, reliance on mock-ups as teaching tools informs critical aspects of learning about the design concepts and processes, but this is not always the case in business. Thus, in this paper we investigate the impact of designing a mock-up by business students in the process of innovation as part of their ability to: (1) generate new ideas, (2) empathise with users, (3) reflect on process, and (4) grow as business practitioners. The methodology underpinning the paper is that of participatory action research. The aim of the paper is to demonstrate how well established techniques from within design practice and education can be used as disruptive processes within business education to craft an innovation curriculum in a higher education environment.

2. The broader context

2.1 Teaching

To date our teaching has been informed by concepts such as 'comfort zone' as a teaching and learning metaphor (Brown, 2008a), the design thinking model (Brown, 2009), Blue Ocean thinking (Kim & Mauborgne, 2005), Strategy Dynamics (Warren, 2008), the Applied Empathy Framework (Knemeyer, 2006) and emotional design (Norman, 2004).

Originally, Luckner and Nadler (1997) argued that, 'through involvement in experiences that are beyond one's comfort zone, individuals are forced to move into an area that feels uncomfortable and unfamiliar – the groan zone. By overcoming these anxious feelings and thoughts of self-doubt while simultaneously sampling success, individuals move from the groan zone to the growth zone' (p. 20). Panicucci (2007) further elaborates: 'experience has shown that learning occurs when people are in their stretch zone. Intellectual development and personal growth do not occur if there is no disequilibrium in a person's current thinking or feeling' (p. 39). However, Brown (2008a) argues for the notion of comfort zone to represent a metaphor of '... how we might think about learning and growth' (p. 11). He maintains that it is through emotional safety, security and stability rather than emphasis on increasing risk that students learn the most. Brown's (2008a) argument offers a very

useful lens through which to understand the context, process, and students' learning experiences on our module, suggesting a far more constructive approach to zones of discomfort.

Brown (2008b) defines design thinking as '... a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity' (p. 86). In particular Brown's (2009) insistence on a harmonious balance of desirability, feasibility and viability is of interest to our teaching as it provides students with a solid framework for reviewing and reflecting upon their proposals.

Blue Ocean thinking (Kim & Mauborgne, 2005) and Strategy Dynamics championed by Warren (2008) provide an overall business platform for this elective module. Kim and Mauborgne (2005) introduce a practical range of tools and techniques such as the Strategy Canvas to highlight what is important to current and potential customers and the Four Actions Framework to help them identify such opportunities. A Strategy Dynamics approach fosters the mapping of interaction between resources – both tangible such as customers and capacity and intangible such as brands.

An Applied Empathy Framework (Knemeyer, 2006) engages '... customers through very thoughtful and intentional design that deeply considers the needs and desires of people - *independently* of the business and strategic goals that usually define the products we design'. This theorising we further expand by the work of Norman (2004) focusing on emotional design. Norman argues that 'business has come to be ruled by logical, rational decision makers, by business models and accountants, with no room for emotion' (p. 10). This is often evident in the nature of business education. In the context of this module, the emotional design prompts students to engage with visceral, behavioural, and reflective design (Norman, 2004) bringing the emotional dimension into the innovation process and to begin to understand the emotional impact of products and services. The use of the above theoretical frameworks in our teaching is critical for the way it supports students in developing and testing their innovative propositions as well as how they respond to the project brief.

2.2 The mock-up

From its inception, the module has focused on one assessment brief which is broken up into four stages: project brief, the pitch, design implementation and business model. However, through the process of questioning the curriculum and the learning experience, we developed a metaphor of a journey as a tool to help our students to grapple with the conceptual complexity of the challenge posed by the module curriculum (Sadowska & Laffy, 2011a). Therefore, students are expected to respond to this brief by starting on a journey consisting of a number of decision-making moments and their own reflections on these decisions. In effect, they have the general direction and four points of reference. They are aware that this journey will be a challenge, but at the same time they cannot predict the precise nature of the experience nor what is awaiting them along the road they will travel. The only way to know is to undertake the journey.

In the context of the module delivery, the design and construction of the mock-ups takes place in the 'design implementation' stage of the students' journey. This stage is theorised by aspects of the classic work by Krippendorff (1995) considering '... the aim of *making* something new and different from what was there before, and the desire to have it make sense, to be recognised and understandable. The former calls for innovation, while the latter calls for the reproduction of historical continuities' (p. 156). In the context of this stage, the mock-up acts as a platform for not only testing new ideas, but also as a means to offer critique and further dialogue. In the environment of our module combining a mix of design management students, business students or finance and marketing students this design method is '... particularly effective in communicating design ideas to diverse groups of stakeholders' (Design Council, 2012). Due to the mock-up being a three-dimensional physical object or model, this set of activities generates challenges of its own; however, by creating such mock-ups students have the opportunity to explore the emotional dimension of the design process both from their own perspective as designers as well as from the perspective of the users. The role of the mock-ups thus evolves to not only provide students with the opportunity to

embody their ideas as physical objects and test them, but also to develop an understanding of their proposals through the process of making and imbuing them with emotional value. This method of prototyping, so often used in design, is not as common in business education, but it is vital to the process of innovation.

3. Methodology

This paper draws from a broader research project that has been based on participatory action research. Reason and Bradbury (2001) define it as ‘... a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes’ (p. 1). Thus, it is a systematic approach that seeks knowledge for social action (Fals-Borda & Rahman, 1991). ‘Action researchers reject the theory/practice divide and believe that applied research can both build theories and solve problems’ (Brinberg & Hirschman, 1986). Ozanne and Saatcioglu (2008) argue that ‘... action research is demanding because researchers are expected to both develop knowledge and work toward social change’ (p. 424). It is an appropriate methodological choice as the research question focuses on solving a practical problem, namely helping students to gain confidence in and understand the process of developing innovative business proposals. It also contributes to the development of knowledge around the integration of design and strategic thinking into a business education by exploring the role a design mock-up can play in developing truly innovative business proposals. The research project pursues ‘... a spiral [of] self-contained cycles of planning, acting and observing, and reflecting’ (Kemmis & McTaggart, 2000, p. 595), which aligns with participatory action research design. The underpinning research design was applied through reflection on module delivery leading to the development of roundtable sessions which delved into issues identified in teaching. The analysis and insights were then fed back into the next round of teaching, followed by further post-teaching reflection. This process began in summer 2009 and has continued until summer 2013.

4. The role of the mock-up in innovation curriculum in a business school (2008-2013)

Each time the module has been delivered, students have been asked to design a mock-up to represent and inform their business proposal. The insights gained from each iteration of the curriculum delivery have prompted us to adjust our teaching to support students better in their development of these mock-ups.

In 2008 when the module ran for the first time, the teaching approach focused on developing an innovative idea followed by a process of identifying the potential customer. In 2009 the teaching approach continued along the same premise, however by now we were much more aware of the students’ need to understand the customer in far greater depth and tried to focus students’ attention on this as a key learning objective. In 2010 the previous teaching approach remained in place; however this was also the time when the concept of a journey began to play a part. The resulting reflections illuminated, in particular, the role of four stages within the journey and brought to the fore the different methods and tools involved in the experience. More time has also been spent on identifying at what point in the journey students felt uncomfortable and why.

By 2011 the journey concept had been fully established. We had gained solid experience of where students struggle and developed ways to help students navigate those zones of discomfort. The process continued to focus on the innovative idea but there was a much more developed approach to enabling the students to understand and empathise with their customers.

Building on all the previous experiences, in 2012 our approach changed and we insisted that students develop a potential customer first followed by spotting a need which could be responded to with an innovative idea. All other parameters were left the same, from the journey concept to other practical methods developed over the years to help students negotiate the discomfort of this journey. Based on the outcomes of this change in 2012, we have continued with this system and implemented the ‘customer first’ approach in 2013.

A comparison of our teaching approach and student response over the years, our assessment feedback, students own reflections, and the generated mock-ups has been revealing as to the role of the mock-up in the overall process of generating truly innovative business propositions on his module. These insights are discussed below.

4.1 2008

The initial delivery of the module highlighted two aspects: 1) the emotional connections students were able to develop when building their mock-ups and 2) the value of developing a three dimensional artefact to see the ideas embodied. Student's emotional investment in the development of the mock-up was evidenced by the attachment students demonstrated in their final presentations and the very personal comments made in their reflections upon receiving their feedback. One of the students even used images from her favourite book, which she cut up to utilise as building material in her mock-up.

The majority of students wanted to explore the spatial elements of their proposals and in these cases their ideas tended to be reinvigorated. It allowed them to see the project in a different light, where the most solid idea came alive with a creative exploration, allowing them to push the boundaries of what could be done within the brief constraints. The two ideas which were not so strong also came alive as the mock-up offered new views and made much more concrete what the students until then experienced as rather abstract concepts. The least successful idea didn't seem to take off in the prototyping phase. This could have been due to the fact that the student chose not to explore their proposal in a three-dimensional mock-up but rather explored two-dimensional branding elements and thus didn't take up the opportunity to physically remodel her concepts – a process that so clearly invigorated the other projects.

4.2 2009

As in the previous iteration, the process of designing a mock-up invigorated students thinking, particularly where the initial ideas seemed weak. However, two new aspects were also evident: 1) the mock-up allowed students to empathise much more directly with their potential customers; and 2) it offered a second chance to identify a possible solution.

One group who focused on developing spaces for people recovering from alcoholism through designing a mock-up for such a space gained insights that they would have found difficult to obtain from any other experience. In particular, the reflection on what has been achieved by the designing of a mock-up has resulted in an 'a-ha' moment for the students which then led to great improvements in the final submission.

“The enthusiasm and creative flare has allowed you to rethink the whole approach and opened up new doors for the Blue Ocean opportunity that you have captured well in the design model. It is also to your credit that you did not abandon your creative input and used it as a strong element to drive your business case” (Group 3 feedback, Spring 2009).

When groups were disappointed by the results of the first part of their journey the process of designing a mock-up provided an opportunity to respond to feedback and gain a sense of achievement and satisfaction at being able to develop something new and visualise it in a physical environment. In a sense the mock-up was often a 'second chance to get it right'.

4.3 2010

This iteration of the module delivery highlighted two further aspects of the mock-ups: 1) the role social interactions played in the process of developing the mock-up, and 2) the impact of the use of prefabricated materials in the design.

For a number of groups the process was associated with a fun carefree exercise and experimentation. However for one group who struggled to come together as a team, this experience which so heavily relied on social and group interactions, was not a success. With a rather weak initial idea and lack of agreement and discontent amongst the team members, the group opted to 'keep it real' and never moved beyond the obvious solution, as observed in their assessment feedback.

"This gives an impression that you have settled for the first possible response, rather than allow your ideas to incubate and mature with time. Although your argument has been to keep it financially real, this constraint has been self imposed and rather misinterpreted. To be real does not mean to lack creativity" (Group 2 feedback, Spring 2010).

In previous years students tended to construct their own mock-up elements, however this time one group used prefabricated parts. Thus, it was interesting to observe the impact this approach had on the overall cohort's group dynamics. At the final submission presentation, the whole class was impressed by the execution and didn't challenge the conceptual framework underpinning the choices. The students who opted to make this particular model were also much more drawn to the 'cool' look and feel of their outcome and didn't truly consider the audience which was meant to interact with the environment they created.

"You have put a lot of effort into your model, but that also meant you have got caught up too much in doing the design and not thinking about the design, many choices you have made were grounded in the aesthetics of the presentation. This is not necessarily a bad thing, but the proposal needed a greater depth of thought as to the meanings that were being communicated" (Group 3 feedback, Spring 2010).

4.4 2011

This iteration of the module illuminated two aspects: 1) how the design of a mock-up helped students cope with 'unfamiliar' and 'uncomfortable' aspects of the innovation process, and 2) the value of learning from one's own mistakes.

From the start the cohort struggled with finding truly innovative ideas. The concept of developing something new was uncomfortable for them and often students seemed to make decisions in the hope to please us as lecturers.

"I think it was at this point we realized that some of our initial ideas really were not suited for this project, and when you notice that weeks go by without being confident that we have a very strong idea, you can easily get wary and frustrated" (Student comment, Spring 2011).

There was a general feeling of low confidence amongst the cohort around creative decision making, often evident in the conversations during tutorials and (in)ability of the students to respond to the given feedback. The process of designing a mock-up led to a set of different innovative outcomes. For two groups the process resulted in an infusion of new perspectives, new energy and momentum to go on with the development, and some new insights that then could be taken to the final stage of the journey.

For another group the design implementation stage was a complete disaster. The initial idea was never really narrowed down, but the group chose to take a risk and develop a mock-up which failed spectacularly. The failure was not in the execution itself and on the day of presentation their peers saw the mock-up as the most impressive submission. The failure was conceptual as the group lacked ability to commit to an idea and didn't develop a relationship between the business proposal and the audience it was meant to attract. Thus the mock-up, although a conceptual failure, became a significant experience for the whole cohort as it provided an occasion for all students to learn from a mistake.

"Of course, I was very disappointed with the mark we got for Project B, but it has taught us something very valuable for our business, if we had not done it and experimented with the idea, then we would have never

known if it would work or not. I believe that we gained a high learning curve from this unsuccessful project” (Student comment, Spring 2011).

It also highlighted to us, as lecturers, the value of learning from mistakes as part of the overall journey and the need for such times and spaces within that journey. Moreover, it brought to the fore the strong impression that many business students see making mistakes in this learning environment as too risky, thus generating discomfort which prevents them from exploring alternative options or taking chances, key aspects of innovation. However, from students’ reactions through the process, it was evident that the experience of designing mock-ups facilitated a ‘reality check’ and provided insight as to how their ideas could be developed further.

4.5 2012

In this iteration of the module, the insistence that customer comes first highlighted the following aspects of the role of the mock-up: 1) the objectives students are meant to fulfil in the preceding stages of their journey, and 2) the need to understand that the mock-up is part of a process rather than a final outcome.

The development of a customer as a starting point was quite a challenge. Students could develop abstract customer profiles but struggled in identifying any real needs hence their business propositions were not as strong or potentially as innovative. The focus on developing and maintaining a solid relationship between the customer and the business proposition was also a challenge and often the logic of the argument was not as solid as it might have been.

In this context the process of designing a mock-up seemed to falter. For one group the process did allow for interpretation of what initially was a rather abstract idea. The mock-up allowed the group to see what their idea could be and how could it work. It allowed them to test out the relationship between the idea and the customer and it allowed for a lot of tacit knowledge about the customer to be embodied in the developed mock-up. However, two other groups didn’t utilise the mock-up in that way. The resulting prototypes were an afterthought, disconnected from the customer as well as from the idea. What the mock-ups revealed is how intrinsically connected and integrated all four stages of the journey are to students undertaking it. It is not enough to ‘understand the customer’ if one does not have a concrete idea.

“Integrating the numbers and utilizing the 3D model to our advantage was also a great challenge. ... I believe that creating a 3D mock-up or prototype is a very good way of seeing your ideas come to life or not. Therefore, in our case after finishing the model and re tweaking our idea many of the question marks were answered. I feel that the model although it wasn’t as successful as I had hoped really marked an important milestone in my journey through this project. It turned both my and the groups personal attitude and commitment to the project around. ... If I would do it again I would definitely have it more focused as to specifically what is it we are offering however, that experience taught me that sometimes you have to do something wrong to know what’s right” (Student comment, Spring 2012).

The positive side of this experience, as in previous years, was the fact that they made mistakes but then learned from them. Two groups acknowledged to varying degrees that their proposals were wrong and discarded their initial ideas. This was evident in their final submission for the project. In one case this was a very successful result in the other not so great as they didn’t follow the logic to the end.

On the other hand, the group who did really well in the design implementation stage didn’t seem to gain any new insights. Formalising and embedding their ideas in the prototype has resulted in their ability to establish that what they initially thought was possible was indeed the case. However, they saw the mock-up as the end of the road conceptually. In the final stage their thinking has not changed. The mock-up became too precious and stopped them from questioning and reflecting on its meaning.

“After the confidence gained from Project A and Project B part 1, My Strategy proved to be more than just a bump in the road. My group members and I had come so far from being the initial ‘underdogs’ that the failure in My Strategy was a shock to say the least. I felt disappointed in myself for ensuring that it wasn’t more successful than it was” (Student comment, Spring, 2012)

4.6 2013

In the latest iteration of the module delivery, students continued to struggle with defining their customers. Although this has always been a challenge, which in effect has prompted the delivery approach introduced in 2012, students in 2013 have found the aspect of empathising with their customers the most challenging.

‘I have never had to specify and choose a very particular customer before, ... I struggled with the idea of this to begin with as there are so many different types of people and reasons ... but I have come to understand the benefit of really identifying the customer ... This was not an easy exercise but it really makes you think hard about the exact customer we want and the traits of the particular person’ (Student comment, Spring, 2013)

The time it took for students to ‘get a handle on’ who their customers were, was far longer than in previous iterations of this module. For all three groups, the process of creating the mock-up revealed that the original assumptions about the customers were not appropriate, prompting the redefinition and rethinking of the project direction. On the other hand, in contrast to the 2012 iteration of the module, students identified with the building of the mock-up as integral to their project journey.

‘The mock-up surprised me as an effective task as it really put some things into question and led to clarifying some cloudy areas of our club. I will remember this when working on other creative briefs in the future; visuals help to understand!’ (Student comment, Spring, 2013)

On the other hand, we have begun noticing reoccurrence of some of the earlier identified impacts the mock-ups have had on students’ engagement with the module content. Hence, as in 2008 the original delivery of the module, the value of developing a three dimensional artefact as embodiment of the business proposal came to the fore. As in 2009 iteration, the process of designing a mock-up served as point of inspiration, particularly where the initial ideas seemed weak; and as in 2010 iteration, the galvanising impact on the social interactions of the teams was clearly evident.

The review of the six years of this module delivery clearly indicates that the process of designing in particular a three-dimensional representation of students’ business proposals can give them insights difficult to obtain another way. These insights often reinvigorate weaker proposals and help students ‘get back on track’ or alternatively provide a significantly different (and ultimately more appropriate) direction. Moreover, the review has highlighted an emergence of patterns of impact the mock-up has on the learning experiences of the students. This has led to identification of much more subtle insights which contribute to our conclusions below.

5. Conclusions

It is clear from the analysis of the mock-ups themselves and students’ engagement as well as responses to the design process that in the short space of a twelve week semester, mixed groups of business students can use the experiences gained from three deliverables: the business pitch, design mock-up and business plan, to come up with truly innovative business proposals.

Many of our students found aspects of the whole process uncomfortable. In the context of this module, it seems that prior experience of the design process and its affordances as well as the way it deals with uncertainty of an outcome is key as to how students can cope with the unfamiliar. It appears that business students who have experienced more traditionally based business education tend to ‘... jump to a particular solution as a way of reducing the uncertainty, and it can be very difficult to free them up from this initial ‘anchoring’ (Sadowska and Laffy, 2011b). On the other hand,

the design management students would have had somewhat greater exposure to design methods inherent in the design process and thus are often more confident that they will arrive at a solution even if it is not clear to them at the start what that solution might be. Nonetheless, for both sets of students there can be a tendency to self-limit or delay until the 'perfect' solution can be found rather than play around with more radical ideas and see where that takes them. The process of designing a physical mock-up could often help them break through many of these self-imposed constraints.

Our analysis has provided us with four particularly interesting insights into how a design mock-up impacts upon students' learning experience: 1) the value of the tactile experience of creating a physical three-dimensional artefact; 2) its ability to imbue business propositions with creativity and empathy; 3) as a platform for managing social interactions within the participating teams; 4) the perception of the mock-up as a conduit in the flow of the process supporting the innovation journey. Where students have truly engaged with the building of a mock-up to represent their proposals, this process has always led to new discoveries and insights enriching their learning process and pushing those proposals beyond obvious solutions. This process, in particular, generated an emotional response from the students and often increased the level of ownership of their learning experience as well as the ideas they are experimenting with leading to a much better understanding of the role design can play in the process of innovation. Thus, we see embedding design in business education crucial in developing an innovation curriculum in a business school. In addition, the inclusion of design tools such as the mock-up not only acts as a generator of new learning experiences for business students, but also can be significantly disruptive to the way students study innovation in a business school environment leading to a much better process of exploration and discovery.

6. References

- Brinberg, D. and Hirschman, E. C. (1986), Multiple orientations for the conduct of marketing research: An analysis of the Academic/Practitioner Distinction, *Journal of Marketing*, 50 (October), pp.161–74.
- Brown, T. with Katz, B. (2009), *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*, New York: Harper Collins.
- Brown, M. (2008a), Comfort zone: Model or metaphor?, *Australian Journal of Outdoor Education*, 12(1), pp.3-12.
- Brown, T. (2008b), Design thinking, *Harvard Business Review*. June: 1-9.
- Curedale, R. (2012), *Design Methods 2: 200 More Ways to Apply Design Thinking*, Topanga: Design Community College, Inc.
- Design Council (2012), Physical Prototyping. Design Council, Retrieved 27.12.2012 from <http://www.designcouncil.org.uk/about-design/How-designers-work/Design-methods/Physical-prototyping/>
- Fals-Borda, O. and Rahman, M. A. (1991), *Action and Knowledge: Breaking the Monopoly with Participatory Action-Research*, London: Intermediate Technology.
- Kelley, D. (2010), *Steelcase education solutions: Student of the month*, Steelcase, Inc. December 2010. Retrieved 05.01.2011 from <http://studentofthemonth.steelcase.com/student/david-kelley>
- Kemmis, S. and McTaggart, R. (2000), Participatory Action Research, In: Denzin, N. K. & Lincoln, Y. S. (eds), *Handbook of Qualitative Research*, 2nd Edition, Thousand Oaks: Sage Publications, pp.567-606.
- Kim, W. C. and Mauborgne, R. (2005), *Blue Ocean Strategy*, Boston, Massachusetts: Harvard Business School Press.

Knemeyer, D. (2006), *Applied empathy: A design framework for meeting human needs and desires*, Published 25 September 2006, Retrieved 5.01.11 from <http://www.uxmatters.com/mt/archives/2006/09/applied-empathy-a-design-framework-for-meeting-human-needs-and-desires.php>

Krippendorff, K. (1995), On the Essential Context of Artifacts or on the Proposition that “Design Is Making sense (of Things)”, In Margolin, V. and Buchanan, R. (eds.), *The Idea of Design: A Design issues Reader*, Cambridge, Mass.: The MIT Press. pp.156-184

Luckner, J. L. and Nadler, R. S. (1997), *Processing the Experience: Strategies to Enhance and Generalize Learning*, (2nd edition), Kendall Hunt: Dubuque, IA.

Norman, D. (2004), *Emotional Design: Why We Love (or Hate) Everyday Things*, New York: Basic Books.

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

Ozanne, J. L. and Saatcioglu, B. (2008) “Participatory action research”. *Journal of Consumer Research*, 35 (August), pp.423-39.

Panicucci, J. (2007), Cornerstones of Adventure Education, In Prouty, D., Panicucci, J. and Collinson, R. (eds.), *Adventure Education: Theory and Application*, Champaign, IL: Human Kinetics, pp.33-48.

Quinn, M. (2012), *What Both MBAs And MFAs Get Wrong About Solving Business Problems*, Co.Design. FastCompany, Published 2012. Retrieved 7.05.12 from <http://www.fastcodesign.com/1669544/need-to-solve-a-tough-business-problem-dont-hire-an-mba>

Reason, P. and Bradbury, H. (2001), Introduction: Inquiry and Participation in Search of a World Worthy of Human Aspiration, In: Reason, P. & Bradbury, H. (eds.), *Handbook of Action Research*. Thousand Oaks, CA: Sage, pp.1-14.

Sadowska, N. and Laffy, D. (2011a), Learning Uncomfortably. *Border Crossing: Transnational Working Papers on Higher Education*. Migration Letters & The London Publishers. Vol.2011, No.1102. pp.15-24.

Sadowska, N. and Laffy, D. (2011b), Learning beyond the comfort zone: helping students integrate design and strategic thinking. *9th International Conference of the European Academy of Design: The Endless End*, Porto, Portugal, 2011.

Warren, K. (2008), *Strategic Management Dynamics*, Chichester: John Wiley and Sons Ltd.