The Learning Needs of Small and Medium-sized Enterprises for Design Led Innovation

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Abstract
Many scholars in the design research field are involved in (post)-graduate design education on the one hand, and some type of corporate education on the other. While there is a growing body of knowledge on educating design students, there is a gap in this research field with regard to the education of non-design professionals. This type of education has become more important now it is increasingly recognized that design can support innovation in businesses, so-called design led innovation. In this paper we focus on educating Small and Medium-sized Enterprises (SMEs). We propose a learner-centred approach to the development of education, which means that insights in the learners’ needs are used to develop programs on design-led innovation. To illustrate this approach we present how the learning needs of SMEs were investigated through the qualitative evaluation of a ‘Building Design Competency’ program. From this study can be concluded that SMEs have specific emotional, social and cognitive characteristics that influence their learning needs. These needs include trustworthy course providers and instructors, a learning community of non-competing peers, customized stimulation of a deep learning approach, and adjustment of teaching material to their initial level of customer and business insights.

Keywords
Design education; Design Capability; Design led innovation; Learner-centred education; Small to Medium Sized Enterprises

It is increasingly recognized that design strategies positively influence innovation outcomes in businesses. There are many indicators that the way that expert designers think and act has merits outside the traditional design domain in both commercial businesses and social enterprises (Brown, 2009; Dorst, 2011; Martin, 2009; Pozzey, Wrigley, & Bucolo, 2012). This paper aims to contribute to the adoption of design strategies in business. To successfully apply design to business systems, design processes of products and services need to be adjusted and linked to the business domain (Bucolo, Wrigley, & Matthews, 2012). The concept that links design and innovation is called design-led, design-driven or design-inspired innovation by scholars in the fields of innovation and design (Bucolo & Matthews, 2010; Brown, 2009; Dong, 2013; Liedtka & Ogilvie, 2011; Verganti, 2008). Several tools and methods have been proposed to unify design and innovation, including for example the business model canvas (Osterwalder & Pigneur, 2010) and the design-led innovation framework of the second author (Bucolo et. al, 2012).

An essential prerequisite for the successful adoption of design-led innovation in companies is that individuals within these firms develop design competences. Hobday, Boddington, and Grantham (2012) suggest that we need to recognize and develop the notion of ‘design capability’ (i.e. experience, knowledge and skill) as an important dimension of design and design thinking in innovation studies. This need for the
development of design capabilities or competences by non-design practitioners also means that there is a need for professional design education.

Many scholars in the design research community are involved in (post)-graduate design education, as well as in professional education such as corporate education programs that are aimed at building the skills and competencies of employees of partner corporations (Ryan, 2009). Although there is a growing body of knowledge on the education of design students (Lawson & Dorst, 2009), and more recently the design education of business students (Matthews, Bucolo, & Wrigley, 2011), it remains relatively unexplored how to educate non-design practitioners on the merits of applying design. This paper addresses this gap in the knowledge about design education.

To further discuss a research agenda on design education for non-design practitioners, we will here present the development and evaluation of a program that was aimed at building design competences in small and medium sized enterprises (SME’s). In this paper we first introduce this ‘Building Design Competency’ program and the research method of evaluating the program. Then we present the results of the evaluation of the needs of SME’s with regard to education in design-led innovation, and how these needs challenge the development of these kinds of programs. We conclude with a discussion of the need for a research agenda that is aimed at studying design education for non-design professionals.

**Building Design Competency program**

The Building Design Competency (BDC) program was developed in partnership between the second author and an Australian state based agency to explore how design competencies can be transferred to SME organisations in a scalable fashion. Several programs exist where ‘design audits’ are undertaken by external groups through one to one engagement (e.g. UK Designing demand programme) to identify gap in knowledge, and develop strategies to overcome these limitations. However, the BDC program focuses on how design knowledge can be transferred to a *group* of SME’s within a cohort environment.

The course as presented in this paper is a pilot for future BDC courses for SME’s. The program was developed for two or three senior management participants of up to ten non-competing firms. It consists of eight one-day group sessions with an average of two weeks between the sessions. The course was completed with an individual company mentoring about two months after the last session to review the transfer of the learning by the firm to their own practice.

**Course content BDC**

The course content was centred around a conceptual framework of design-led innovation developed by the second author of this paper, based on his experience as a design practitioner and educator in a business context (Bucolo, Wrigley, & Matthews, 2012). This framework is illustrated in figure 1. The framework acknowledges that within any business a continuum exists between operational and strategic activities, and these activities have both an internal and external focus. A detailed explanation of this framework can be found in Bucolo, Wrigley, & Matthews (2012). Key to the achievement of strategic value of design is the development of ‘propositions’ that link opportunities for future products and services based on deep customer insights, as illustrated on the left side of the framework, to the strategic activity and brand on the right side of the framework. To represent these propositions it is recommended to create narratives (Beckman & Barry, 2009) that illustrate the value and meaning that should be embedded in future products and services. By prototyping these propositions early on in the design process, they can then be used as a communication tool to validate the need for the proposed value and meaning with
customers on the one hand, and to develop a company strategy that is aligned with the proposition on the other hand.

The ‘design’ of propositions is based on gathering deep customer insights. To explain different levels of depth in customer insights we developed a simple framework that is based on the ViP framework of Hekkert and van Dijk (2011). The latter framework explains how going from a product level, through an interaction level to a context level allows establishing a ‘raison d’être’ or vision for a final design. The context level describes why a product (design) exists in a certain context: people’s needs and motives within a certain worldview of the designer. We translated this into a model with a ‘what’, ‘how’ and ‘why’-level. This model is illustrated in figure 2. Investigating the customers meaning and values in the current situation allows for the development of new preferred interactions and products and services in the future.
In the course we presented a step-by-step method to gather customer insights on the why-level and translate them into value propositions. This process can be summarized as follows (figure 3):

- Visualize current business in business model canvas (Osterwalder & Pigneur, 2010)
- Create customer journey map
- Contextualize customer journey to stories with (current) value proposition (Beckman & Barry, 2009)
- Customer interviews in which customer reflect on the stories (comparable to scenario validation (van der Bijl-Brouwer & van der Voort, 2013))
- Theme identification through grouping quotes from the interviews
- Thematic analysis and deepening of the themes (Dorst, 2013) to interpret the data at the why-level
- Reframing of the problem: develop new value propositions
- Align value propositions with strategic activities (Bucolo et al., 2012) and new business model canvas

Participants started with step 1,2 and 3 and subsequently continued with iterations in the process, as visualized in figure 3.

Figure 3: method for developing value propositions as presented in the BDC program.

Key to the approach we developed for this program was ensuring the participants adopted a design thinking mindset, which would allow them to explore and adjust the application of the tools and methods to their own business contexts. The proposed design innovation method served as a ‘prototype’ for a pilot of this program and allowed us to both evaluate
the content as well as the teaching method of the course (see next section) with regard to the learning needs of SME’s.

Teaching method BDC program

The BDC program is aimed at having companies build their own capability to innovate. This objective is different from many other innovation advice programs that tell companies what to innovate instead of how to innovate. We therefore adopted a teaching approach aimed at experiential learning. Although there is no clear consensus in the educational research field about the definition of experience and experiential learning (Moon, 2004), we adopt the viewpoint of Boud, Cohen, and Walker (1993) who suggest that “experience is an encounter. It is not just an observation, a passive undergoing of something, but an active engagement with the environment of which the learner is an important part” (ibid, p6). An essential part of experiential learning is reflection on the experience (Moon, 2004), as visualized in the well-known learning cycle of Kolb (1984). Most of the time of the BDC program was therefore spent on exercises – as part of the day session or as ‘homework’ - in which participants had to apply the proposed design innovation method to their own practice, and reflect on it in the group sessions. Thus it followed the principles of a design studio critique.

Another educational element of the BDC program was the use of peer feedback. Organizing group sessions was an efficient teaching intervention, while at the same time offering the opportunity to make use of peer feedback. Feedback from peers can stimulate the development of a critical stance in reflection on experiences, which is necessary to prevent self-perpetuating reflection (Moon, 2004). As Boud et al. (1993) state: reflection is not just an individual activity; engaging in the process with another person or with a group can change the meaning we draw from experience. We therefore had participants present their experiences in the group sessions so others could comment on it (figure 4), which resulted in highly reflective sessions.

Figure 4: peers give feedback on the customer journey maps of one of the participants

Research method

The objective of our program evaluation was to investigate the needs of SME’s with regard to education in design-led innovation. In the development of the BDC program, we realized we were going through a design cycle ourselves with the program as the object of the design, and the participants as our customers. We needed a formative evaluation to gather insights as input to the redesign of the program. We therefore chose to adopt a qualitative research approach.

Since the government agency that had organised the course also participated in the course, and since the course participants were also that agency’s customers, we could
gather customer insights through the method we proposed in the content of the program. In this case it was essentially the government agency that gathered the data from their (and our) customers through our guidance. For example we had the agency interview the course participants in one session and we identified and analysed the themes from these interviews, together with participants, in another session.

In addition to the data gathered by the government agency, we recorded the presentations of the participants in each session in which they reflected on their experiences. Finally we evaluated the program in a group interview in the last session, which was also recorded.

To analyse the data, relevant parts of the recordings were transcribed. Next, in an iterative process, sections from the transcripts and survey were assigned to reoccurring themes in answer to the research questions.

Results

Four groups of two to four employees (including the firm owners or employees empowered to make or support strategic decisions) from different enterprises completed the course: two family businesses, an academic service department and the government agency that offered the program. The participants were not professional designers although one participant had a background in graphic design. Although the group was small, evaluating the program did allow us to explore the needs of SME’s in learning design-led innovation. We acknowledge that data of additional companies is necessary to be able to generalize the results.

Emotional issues of family businesses

The fact that two of the participating companies were family businesses clearly influenced the way these firms approached the whole learning process. Firstly they were very motivated to learn to innovate in order to sustain and grow their family business. The following quote shows the fear to loose the business as expressed by one of the participants:

“It’s a real issue of psychology in our business, because we’ve come from [a very profitable period] in the eighties and we’ve just been bashed over the head repeatedly for twenty years, [...] loosing staff and so on. [And] also from a kind of respect of what the work is and just in a broader societal thing where people see [our type of business] and I think we feel like, and I think [my in-laws] have felt like, well, what do you want? [...] I’ll do whatever you want, just please [buy our service].”

On the other hand their protective attitude towards their business seemed to negatively influence their openness to change. This corresponds to studies that show that some family firms may over time become resistant to change and follow conservative strategies (Zahra, 2005). One participant reflected as follows on the story that the government agency presented about the problems of a hypothetical family firm:

“If he [the character in the story] is quite emotionally involved. It’s his business. He has started it. It’s a family business. It might even be worthwhile getting in foreign eyes. Because [...] he may be painting your view and not going down to look at something, because [he might think] I can’t do that because I know what the consequence is.”

All participants confirmed that one of the reasons they were motivated to participate in the BDC course was that it allowed them to have someone else look at their own business, which they thought would positively influence their innovation process.

“I need an impartial view that is not emotionally connected.”
One participant indicated the emotional connectedness was also a barrier for her in asking feedback from customers, because she did not like her business to be criticized. It turned out that instead of asking feedback on their current business, asking feedback on new value propositions in the narratives did not give her this negative feeling:

“Doing the interviews with the stories allowed me to look at our business in a non emotional way.[..] It is a relief that we did not have to be tied to our current business model and that we can explore others”

These comments show that participants were aware of their emotional connectedness to their business and that they would like someone else to look at their business, while at the same time appreciating the development of their competence in reflecting on their business in a ‘non-emotional way’.

**Trustworthiness of course providers**

From the interviews of the course participants by the government agency we learned that an essential element of the program that stimulated participants motivation to enter the course, as well as their willingness to be challenged, was the level of trust the participants had in the course providers and instructors.

We therefore unpacked the theme ‘trust’ further in a hermeneutic phenomenological conversation in which participants talked about what (dis-)trust means to them, and shared lived experiences (van Manen, 1990) of (dis-)trust with people and organisations/communities – not related to the BDC program -, such as friends, family, politicians, banks, neighbours etc. After this discussion we moved back to the context of the BDC program to investigate how trust influences the learning experience.

The level of trust that is needed is firstly related to the need for investment. More trust is needed when more investment is needed. For the BDC course considerable investment was needed in terms of time (the 8 full-day modules) and effort, which meant the participants needed to trust the course provider. A second important reason for the need for trust is that trust is a prerequisite to be able to take someone out of his or her comfort zone. A central element of the BDC program was to challenge participants on their ideas and believes about their businesses and customers. Educational research shows that extensive accommodation of someone’s cognitive structure – deep learning - can only be achieved through these kinds of challenges (for example, Moon, 2004). The term ‘cognitive dissonance’ has been used to describe the – often uncomfortable - situations in which new material of learning is in conflict with the learner’s cognitive structure (Festinger, 1957). Learning to innovate means learning to challenge your own assumptions about your business. The emotional connectedness of participants to their family-business can make this challenge very hard. Gaining trust is therefore crucial for the success of the BDC program:

“After the first day we were very confused and questioning why we were in this business. It was very confronting.”

To gain trust requires evidence of capability through a history of performance. Knowledge of bad performance in the past can negatively influence trust. In case of the BDC program, participants checked the performance of the instructors online. Participants also mentioned that personal testimonials could provide this trust:

“What would be powerful as an information source would be: "Hi, this is [name participant], I just completed the course. So and so told me you were thinking about doing it. How about we catch up or a coffee and talk about what I got out of it. Bang on, you’ve got the trust.”

Gaining trust also requires showing empathy. Companies indicated they would feel more trust if they would feel they were understood:
“[In making a choice for advice] you would probably look at the person to see how much you feel they understood your business. How well they listened.”

Gaining trust requires transparency about one’s motivations and interests. In case of the BDC program this means that every member of the government agency, as well as the instructors, needs to be transparent about their drivers to offer the course. A problem here is that the agency tends to talk about their drivers in terms of ‘writing policy’, but that the companies did not relate to that at all. A member of the agency indicated that they mainly used that terminology to communicate their drivers to the minister, their other ‘customer’, and realized now this language was not suitable for SME’s.

**Trust within the peer group**

Apart from trusting other people and organisations, we also explored the issue of trusting people that are part of a community you feel you belong to. Participants were challenged in the BDC program by both the instructors and their peers. Therefore it was not only important that they trusted the instructors and course providers, but also the other participants. Participants indicated they very much trusted the group which had a very positive effect on the peer feedback process.

“It is nice to have other businesses reflect on the same problems, the same attitude, the same feelings about stuff in completely different industries.”

To build this trusted community required time to get to know each other. In the course this was achieved through providing opportunity for informal socializing during lunch and drinks after each day-session.

“I don’t know whether you want to [give this peer feedback] from the first, because you need some development of trust for the people that you are with and taking on their feedback.”

Participants also talked about the number of people in the group that allows this development of trust. The relatively small group of participants clearly had a positive influence on the establishment of trust within the group.

“I wouldn’t want to do this course with 100 people in the room. The fact that we had small groups was really interesting for us”

Although we purposefully chose a teaching process which included peer feedback, the feedback worked even better than we expected, and we gradually allowed for more time to reflect on each other’s work during the course.

**Subjectively constructed learning experience**

We noticed that participants seemed to approach the learning experience in different ways. The design innovation method that we presented is just one possible approach and it might not be the optimal one for specific companies. One of the participants had a particular critical stance towards this teaching material and for each exercise sought for ways that would fit her situation best. For example, she decided to conduct a survey instead of a customer interview, and when asked to make a customer journey map, she actively searched online for different types of customer journey maps. Even though the former approach did not lead to satisfying results, they both were very valuable learning experiences because of her critical reflection, as illustrated by her comments on looking into different types of customer journey maps:
“There’s so much information out there and looking at other peoples journey maps was really helpful and really unhelpful, because they all make sense, but then don’t apply at all, because you have to make up your own thing. And when I realized that I don’t actually have to produce something that is, that looks like this thing over here. That I can actually produce something that is whatever I feel like making. That made it a lot easier.”

On the contrary, other participants would try to exactly apply the method as we presented it to them, and therefore had completely different learning experiences.

This example shows that participants differ with regard to their critical reflective orientation towards their learning experience. According to theorist, such a critical stance towards learning experiences and resulting deeper reflection yields better quality outcomes in terms of learning (Moon, 2004). When different learners are involved in the same event, their experience of it will vary and they will construct it differently (Boud et al., 1993). This means we cannot expect that every single participant will get to this deeper level of reflection. However, in hindsight, we also did not investigate participant’s learning competences at the start of the course or discuss it with participants during the course. In a course redesign we should analyse these competences and try to stimulate a deep approach to learning.

**Competence levels**

Insight in increased competence levels is necessary to assess the outcome of the course. As the course was not part of formal education, we did not conclude with a formal assessment of participants’ competences. We therefore can only assess their competences based on what participants presented in the course and the mentoring.

We identified a number of salient competences that were either clearly developed during the course, or were on the contrary so undeveloped that they hampered the innovation process:

- **Gathering deep customer insights**: participants were asked to interview their (potential) customers under guidance of one of the instructors. Participants indicated that their interview skills to get to the customers values and meanings were clearly less developed than the interview skills of the instructor.

- **Understanding the customer insights**: some of the participants indicated they found it hard to retrieve the customer’s values and meanings from the data they had gathered in the interview. After doing exercises within the session in which they collectively analysed their own and others data, participants indicated that they now reflected on their customer interview in a different way.

- **Developing value propositions**: the capability to reframe their current value propositions based on the gathered customer insights proved to be difficult for all of the participants. After having gone through several cycles of customer interviews, participants still indicated having difficulties with creating value propositions.

- **Developing new strategic activities**: participants did not get to the step of creating new strategic activities for the value propositions. This was largely caused by the fact that their level of knowledge of their customers at the start of the course was much lower than we had expected. Therefore we had to spend more time on mapping the current situation of the businesses before moving to future value propositions.

- **Focussing on possible futures or propositions (which may not be directly relevant to their business)**: we needed to assist the participants to stop seeking specific solutions to allow them to explore alternative directions and opportunities.
The participants’ level of maturity to question and reframe value propositions gradually increased, as demonstrated in the final mentoring session, which was held two months after the final cohort session where firms had undertaken completely new directions based on their questioning of insights. Although no clear framework for assessing design innovation competence levels is available, we found some indications that some participants had progressed to a level of quality of learning in which they were able to generalize their learning to situations they had not experienced within the course, which corresponds to the highest level of complexity in the so-called ‘Structure of Observed Learning Outcome’ (SOLO) taxonomy (Biggs & Collis, 1982):

“I can’t buy anything now without a whole analysis of the business.”

“It's not just about the customers; it's also about the internal people [who] need to understand the message. So my main thing is trying to sell it up the chain as well. But then again that's also what it's all about, because if you actually tap into that person's meaning and values, you're doing the same thing.”

Another indication of the quality of learning is the extent to which participants transfer their learning to their own work situation. The participant with a background in graphic design indicated that she felt she had at least gained the necessary level of confidence to start applying her learnings:

Participant: “for someone coming from a creative background I've come from, business [...] all just feels a bit too hard. Whereas this allowed me as a creative person to see that I can use my design thinking that I use within my design work and apply it to really practical hands-on business stuff. [...] There are practical things you can do. There is a, b, and then c and then you mix it all up [...] and that is amazing to me.”

Instructor: “do you mean you feel more confident?”

Participant: “absolutely. And that's like I don't have a right to say anything about business because I don't have an MBA. I'm like, well, I have a logical brain that can pull the stuff apart and figure it out.”

On the other hand, as mentioned above, there were also competences that were not developed enough and hampered the innovation process. Participants also indicated they felt they would need more support in the future, and that they for example did not know yet how to take the important strategic decisions. This shows that the course led to mixed learning outcomes. We therefore plan to continue to support this and future cohorts in 6 months intervals to reinform and share learnings as their approach to design led innovation matures.

Discussion and conclusion

Summarizing, we found the following needs of the participating SME’s for learning design-led innovation:

- The emotional connectedness of family firms influences their openness to change and critical feedback. They therefore need ‘foreign eyes’ to look at their business, and to learn to reflect on their business non-emotionally. Trust needs to be gained by instructors, to stimulate participants to put time and effort in participation in the course, and to be able to challenge them. Trust can be achieved through history of performance, showing empathy, and transparency of motivations.
- The firms benefit from being part of a trusted community of (non-competing) peers that can also provide this external view on their business.
The individuals within the firms differ with regard to their approach to learning which influences their need for stimulation of a deep approach to learning.

The initial knowledge of participating firms about their customer's influences the starting point in the design innovation process. Firms that have little knowledge of their customers need more time and iterations to get to a strategic level in the development of value propositions.

The participants' level of maturity to question and reframe value propositions clearly increased. However they were still eager to have the support to question if their approach was valid.

These results show that specific learners have specific needs with regard to a design innovation course. The success of the BDC program was strongly influenced by the emotional, social and cognitive characteristics of the participants. This corresponds to the proposition of Boud et al. (1993) that what learners bring to an event - their expectations, knowledge, attitudes and emotions - will influence their interpretation of it and their own construction of what they experience (p11). This shows that in order to design successful education for non-design professionals we need to further study these needs. For the BDC program this means that for a next program we would need to get insight in these characteristics of participating firms as early as possible in the course, so we can adapt the course to these needs.

We would also like to argue that for the development of these kinds of programs a learner-centred approach to designing education should be adopted. The learner-centred approach we followed has its roots in the design research domain itself. Firstly, we adopted a human-centred design approach, which allows designing for diverse ‘users’ (van der Bijl-Brouwer, van der Molen & van der Voort, 2013), and is based on the idea that deep insights in human needs and values are needed to allow reframing of problems (Bucolo et al., 2012; Dorst, 2011). Secondly, the design approach is characterized by an iterative design approach, which in this case means that we ‘prototyped’ a course which we evaluated to develop a proposal for a new course. Recent studies suggest that this type of human-centred design has merits outside the traditional design field (see for example Dorst, 2011), including education, which is currently being explored by the educational research field itself (Reeves, McKenney, & Herrington, 2011).

Furthermore there is a need for research agenda which focuses on the learning needs of non-design professionals. This would include research of the required levels of design competences. As Dong (2013, p0241) suggests "researchers should investigate the evolution of capabilities [associated with design-led innovation] in companies, just as design researchers currently study the development of design skills in students." These capabilities are probably different for SME’s than for large organizations, which means we need to understand the creative and social life of small firms (Hobday et al., 2012). If we want SME’s to benefit from the development of knowledge in the design (innovation) research field, then we should carefully design and research the educational means through which this can be achieved.

References


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Professor Sam Bucolo is a leading academic and practitioner in the emerging field of design led innovation, who has led several projects which has transformed business through embedding design capability within organisations. Sam has published widely on the topic of the value of design to industry and has undertaken several significant projects with a wide variety of firms to be recognised as a leader in this field. As Professor of Design and Innovation at the University of Technology Sydney, he leads a team investigating the value of Design Led Innovation to the Australian Economy. Sam also is also the convenor of the recently established Australian Design Integration network and is an executive board member of the Cumulus global network.