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PRECONCEPTIONS ABOUT DESIGN AMONG DESIGNERS AND CLIENTS

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1. Introduction

For more than a decade, integrated product development has been advocated for reduced time to market [Ehrlenspiel 1995]. Dialogue and exchange of marketing, design and production expertise in the early stages of product development enable the integration of multiple requirements at the conceptual level and help to avoid delays and cost implications of late modifications. In many aspects, integration has now become the normality of design practice. Designers often contribute to a multi-faceted, diversely skilled team. Yet the communication and collaboration in interdisciplinary teams remains challenging. To be respected in this team context designers must clearly externalise and articulate what they offer. That requires an awareness and understanding what design is about, a topic regularly debated within the scientific community [Lossack & Blessing 2003, Hatchuel & Weil 2003].
Also the success of projects depends not only on the design competence. Observation of design teams show that even if the majority of time is spend on individual designing, many of the critical situations within a design project in industry involve communicating and collaborating with other people such as clients, management, other departments and team colleagues [Frankenberger and Badke-Schaub 1998]. Communication between participants from different disciplines is often impeded by barriers on the participant, the project or the organisational level [Kleinsmann and Valkenburg 2003].
Although this social nature of design has long been acknowledged, university education provides very little training for the required skills. Social skills are seen as important by employers but not assessed as part of the curriculum. Approaches to improve this situation have focussed on broadening the list of skills necessary for design [Lewis and Bonollo 2002]:

1. Negotiation with the client for task clarification and changing demands
2. Problem solving and design process skills
3. Acceptance of responsibility for outcomes
4. Interpersonal skills in dealing with the client
5. Project management skills for planning and meeting targets.

Most commonly these non-technical skills are developed through experiential learning either on the job or during project work as part of design education. However, the students are usually left to themselves to handle critical situations without any instruction and professional feedback or reflection. Lauche [2003] has proposed a framework to teach non-technical skills explicitly as part of design education, which included team communication as part of this training. An evaluation with a behavioural marker system showed that skills could be improved significantly over six weeks.
This paper argues that the communication is also influenced by the mutual preconceptions that designers and their clients or colleagues from other disciplines hold about design. Preconceptions are

social categorisations and mental models about somebody's capabilities and their usefulness. They are individual believes but influenced by collective assumptions such as the effects of globalisation, the impact of new technology, the benefits of design methodology. Preconceptions influence the allocation of tasks between engineering and industrial design, what difficulties designers may encounter, and what kind of roles designers assume. The investigation is based on a set of case studies on the collaboration between designers and other disciplines as well as clients. The paper outlines the context of collaboration and the research method used, followed by a description of the cases. The analysis capitalises on the preconceptions and the framework of collaboration between universities and industry. Potential consequences for collaborative projects and design education are discussed at the end.

2. Context of Teaching Company Scheme

The case studies originated from the Design Innovation Cluster, a group of lecturers and researchers with an interest in design innovation at Robert Gordon University, Aberdeen, Scotland. The group aims to develop and redefine the role of the designer through cross-disciplinary research. The intention is to inform curriculum development within the School and design education provision within the UK. As part of their research activity, members are involved in collaborations with external partners on a commercial and non-commercial basis. It was decided that a researcher not actively involved in these collaborations should interview designers and clients to investigate experiences so far and analyse how both sides perceived their role and whether this changed over the course of the project.
Three of these collaborations were part of a publicly funded framework called Teaching Company Scheme. The Teaching Company Scheme is a UK Government initiative of the Department of Trade and Industry (DTI) and the Research Councils for postgraduate training and development in UK businesses. It involves three parties: a company with an interest in applied research, an academic institution, and the TCS associate, a graduate placed in the company with academic support from a university for two years. The funding is competitive and for successful proposals, the government contributes to the associate's salary and provides a framework for regular meetings and reports. The idea is that all parties benefit from the collaboration:

- The company can tackle a relevant problem with expertise from research institutions they currently do not possess and attract high calibre graduates.
- Universities can apply their expertise to important business problems and gain experience of current business developments, which can influence your research and create business opportunities. The academic supervisor dedicates half a day a week to advising the associate and to knowledge transfer to the company.
- The associate continues to learn and develop their skills and knowledge in an industrial context and increase their employability.

The scheme was established in 1975 and around 4,000 partnerships have been funded often from different disciplines. The programme has now been renamed Knowledge Transfer Partnership and continues in a more flexible form.

3. Research method

The author who was not party to the collaborative projects interviewed each designer and their client retrospectively. Four cases were selected where the client was deemed approachable to openly talk about their experience; three others were excluded for being too sensitive for personal or commercial reasons. Semi-structured interviews were carried out with four designers and five client representatives independently at their respective workplace. The interview guideline (see table 1) addressed how the relationship evolved over time, difficult periods and successes of the project, and lessons learned from the collaboration. In all cases, the members of the Design Innovation Cluster were interviewed first to obtain some background information on the collaboration. Information and evaluative comments provided by one party were not shared with the other.

Table 1. Interview questions

How did the relationship between yourself and the client/designer begin? How would you define your role in relation to project X? Did this role change during the course of the project? What were your pre-conceptions of what the client/designer could contribute to project X?
Did you have any difficult periods during the project and if so, how were they overcome? What was the greatest success of the project and how was that achieved?
What lessons have you learned from undertaking this collaborative design project?

The interviews were tape-recorded and transcribed verbatim. For each case, the transcripts were analysed in comparison for the versions of event for similarity and difference in attribution of how and why the collaboration developed in a certain way. The content analysis extracted underlying assumption about the roles of designers and non-designers (end-users, clients, engineers etc.).

4. Description of the cases

All collaborations started with the non-academic partner going through some organisational change or facing a new business situation. The focus of the business developed into a new direction, key people changed, and new technology was seen as an opportunity to lift communication with end-users onto a different level. In all four cases there was a perception that in this situation external input would be beneficial, and collaboration with the university seemed to be an appropriate means. The focus of the collaboration changed over time in a way that was only partly foreseen by the partners. In all but one case, the designer started out developing a product but ended up designing a process that changed the internal way of working.

In two cases the TCS collaboration coincided with an organisational change from a manufacturing oriented company to a product development company. One company specialised in hardware for the cosmetics industry such as hair care products. The other one provided protection garments for dangerous work environments such as military and offshore work. In both cases the company traditionally had strong links to the actual manufacturing of these products. Yet they began to realise that for their competitive position on the international market, they had to capitalise on their competence to develop products. In both cases the associate designer was instrumental in extracting, informing and formalising the underlying design methodology. Apart from design input to a number of new products, the main outcome of the collaboration was a process description. The description was later transformed into a tool, in one case on paper, in the other as an interactive computer-based tool. The aim was similar to that of the IPAS tool [Ambrosy 1997] but with a focus on the design rather than the engineering aspect of new product development. Both cases started with some appreciation that the designer would contribute the expertise to turn customer needs into materialised form that they themselves did not possess. The great success was seen in an improved process, as one interviewee stated: “We were able to show that using a structured process can save time on innovations. We improved exponentially on obtaining the information early and getting the design frozen”.

The other two cases dealt with database and web design in order to make information available to end-users. A local library wanted to make its large but unorganised photographic collection available to the public for viewing and printing. An engineering company wanted to publish product information on their website for downloading. In both cases, the designers first focussed on interaction principles, metaphors and colours for the user interface. Closer analysis revealed however that the preparation of the actual content (the digitalisation of the old photographs, the writing of manuals) entailed a major undertaking that had to be completed before the end-user design could be finished. The provision of the content required training in, or the design of, appropriate software systems for the content task.

In two cases the industrial partners felt they had got an excellent young designer: “We would have never got somebody of this quality for a company of this size”. If the collaboration with the TCS associate worked out well, companies offered to employ the person on a permanent basis. Not all TCS scheme turned out positive, however: In one case, a sometimes difficult but mostly productive interaction turned sour over a quarrel of intellectual property rights despite a clear prior agreement

between all parties. Interviewees also said that in hindsight they would have been more specific about each other's contributions: What does the company expect? What can the university offer? This desire for clarification was mostly driven buy the wish to have known earlier what one knew at the end. One interview partner acknowledged that changes in the project were inevitable and it might be wise to include a strategic review if the constellation of people still provided the best mix of expertise for the company's needs.

5. Analysis of the TCS scheme

All interview partners commented that the success of the TCS scheme depended on the "right people", in particular the person of the associate. Depending on how the interaction was perceived on the personal level, the collaboration was viewed as either productive or difficult. Although the general idea was welcomed ("it is a great idea having a clever young guy come into the company where he makes a contribution while he is also learning"), the actual time was described as "torture", a "difficult time" and a "bureaucratic nightmare". The companies reported that their academic partners did not find the time and were difficult to contact, and academics felt not involved enough to know when and how to intervene. The re-occurrence of this response indicates that behind the personal issues there are underlying structural aspects.

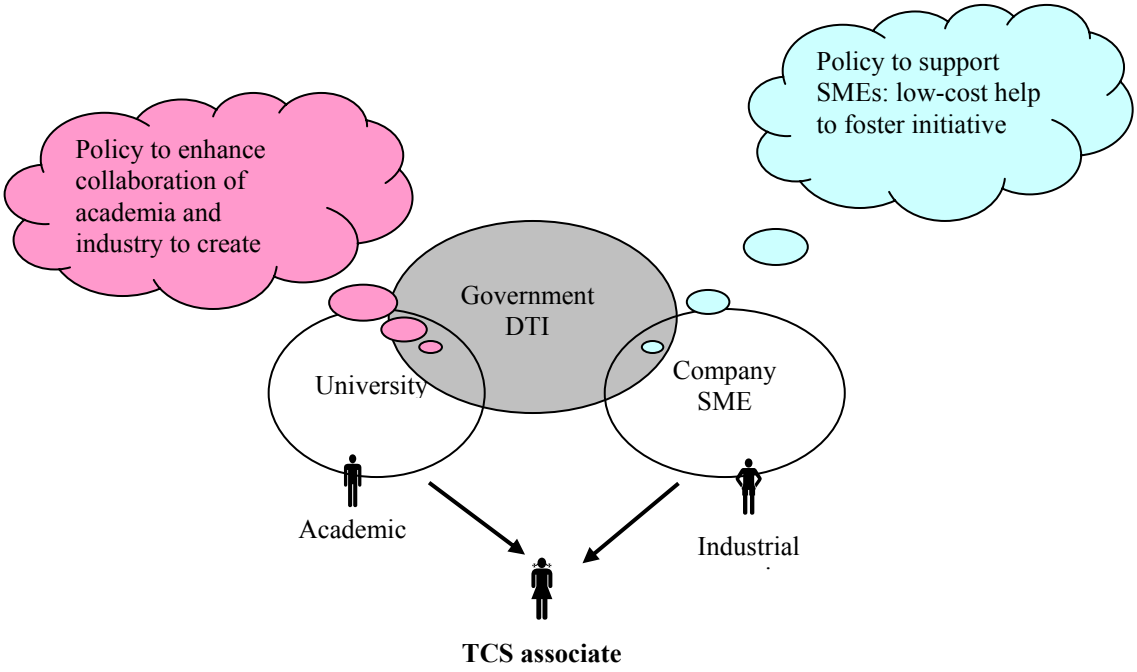

Figure 1. The TCS scheme: Lack of shared goals between universities and companies

As Figure 1 indicates, the framework is driven by policies that make it attractive to have a high number of schemes for universities and an affordable extra pair of hands for a company. There is no incentive as such for the university and the company to collaborate productively. The industrial partners complained that universities only get rewarded for the number of TCS schemes awarded, not the quality of the outcome. The also noted that there was a tendency to "tick the box" and give a good impression rather than achieve tangible outcomes. In Britain, academia and industry are traditionally seen as two distinct cultures with different aims and different timescales. This hiatus can only be overcome on a project-by-project basis and only if all three partners bring the appropriate skill mix and openness for dialogue to the collaboration. Judging from the interviews, the scheme requires the associate to be more mature than most UK students are at the time of graduation.

Within this constellation, the communication between designers and non-designers only adds to this complexity. It became difficult to entangle which aspects of the experience were attributed to the fact that the collaboration was between designers and other professions, or to the fact that it was between

university and industry. Most partners had previously worked with designers and acquired some understanding of what design could bring to their business but mostly on a short-term contract basis.
Interviewees also commented on the fact that working with a small company may not be an easy start for new graduates. The companies were focussed on day-to-day operations with limited personnel in each role, so associates had to learn on the job with limited opportunities for support and instruction. If an associate was mature and felt competent, they could take initiative and have more impact than in a larger organisation. If the associate still needed to learn from the job, the support from the university was even more critical.

6. Analysis of preconceptions

From the content analysis of the interviews, underlying assumptions that may have influenced the views on the project were extracted. They are summarised from the designers' and the companies' perspective.
From the designer's perspective, the main preconception was that design and designers are essential to product development yet undervalued. “Engineering companies need industrial design to be successful, but they don’t notice it. They perceive design as not worth paying for upfront, so they employ engineers, and therefore fail.“ The key competence that should not be carried out by any other discipline as they are not properly trained to do so, was phrased as interaction, visual design etc. Beyond that, the designers also felt that as a discipline they were best suited to facilitate inter-disciplinary communication. "People with single specialities are problematic as project leaders because they don’t appreciate the mixture of expertise needed. “
The designers referred to two changes in their role: the increased importance of software tools, and the shift from product to process design. The competent use of software tools had become vital to enable repurposing of data for manufacture, packaging or advertising. The same, may be added, it true for engineering under the label digital product or product data management. The case study also showed that while companies think about databases from an IT perspective and designers think about the graphical user interface, both underestimate the amount of work related to working on its content.
The shift from products to processes was new to the designers as well as the companies. One designer said that in a field that is not necessarily driven by design one would expect it to be difficult to instil design methods. To his surprise he found that the company was ready to embrace a systematic design method. However, as the designers were beginning to develop an awareness of how their task changed, most clients continued to refer to their work as the product.
Preconceptions on behalf of the companies mostly had to do with the need to act in a commercial environment without being able to control it. "Customers don't wait, and we can't change that, so if the university want to become commercial they have to adapt", one interviewee explained. Commercial awareness included timeliness of response and cost-sensitive design solutions. The industrial partner felt that only 50% of the students showed this awareness and not all of the academics. On the other hand, in the non-TCS case it was felt that any commercial solution would have resulted in a compromise and only the non-commercial long-term collaboration had allowed for a desirable outcome. In all cases, non-academic partners felt that a more stringent planning of the project would have been desirable - and indeed possible, unlike the designers who viewed the changes as part of the normal process of design innovation.
The companies also learnt how to communicate with the designers: "In order to get across to the designer what you want, you need to speak to them in a language they understand". This may involve, as happened in two of the cases, developing some design methodology of one's own before commission a design consultancy. Both sides emphasised the importance of a constant dialogue and developing a common language.

7. Discussion and conclusion

This analysis of four case studies has investigated preconception about design among designers and their clients or colleagues from other disciplines in the context of a university collaborating with industry. The cases showed how, over the period of two years, the focus shifted from the design of products to the description of processes, and the design of software tools and databases to supporting user interaction.

As indicated in the introduction, individual preconceptions are indicative of collective assumptions. So the change within the meaning of design can also be interpreted on a sociological level. The international division of labour between hand and brain among Western industrialised nations and low-cost production countries in the South or Far East has lead to the collective belief that Britain is no longer a place for manufacturing. This collective belief re-occurred in the statements given during these interviews and is echoed in the increase of knowledge intensive work. Designers on the other hand have traditionally been trained to work with hand AND brain and to immerse their thinking into the material world. Conceptualising and making have always been iterative steps during design. The designers in these case studies now found themselves at the conceptual end of a separation of head and hand. As a result their task became more abstract and software-based, less manual.

Another important conclusion is that designers brought their ability to systematically analyse a design problem to bear in the collaboration, yet the companies felt that the project as such were not sufficiently structured and planned. One could stipulate that the design method was applied to the product but not to the protagonists' own actions. However, the idea of reflection as a strategy to avoid going down the wrong alley should be applicable at the organisational level as well.

So far these conclusions are based on a very small sample and should be treated with caution. Only nine people were interviewed, and in all cases the designer - client interaction was confounded with a university - industry collaboration, which is by no means typical for design work. The case may also represent an idiosyncratic situation in the North-East of Scotland, and the interpretation may not be generally applicable. However, the cases do support the attempts to broaden design education to include software and non-technical skills and to encourage the ability to analyse and reflect one's own role and action. They also make it clear that including relevance into further education by establishing links with industry requires careful planning if all parties are to benefit. Simply placing a young designer into a company without appropriate resources on the academic and business side is not a recipe for success.

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