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IMMEDIATE, PRODUCT AND REMOTE DESIGN

Turkka Keinonen

School of Design and Environment, National University of Singapore, akitkk@nus.edu.sg / School of Design, University of Art and Design Helsinki, tkeino@uiah.fi

ABSTRACT

This paper presents a macro level model of design with three internally coherent modes of design. These are **immediate design** dealing with users' immediate situated challenges, traditional **product design** creating generally appealing solutions, and **remote design**, which elaborates on preconditions for design such as knowledge, platforms and standards. The need for the model is justified by a discussion addressing a set of conflicting trends called **design tensions** within the design of complicated human-technology systems. These include technology, innovation, competence, readiness and generality tensions. Finally, the impact of immediate and remote design on design education and design business is discussed.

Keywords: Design profession, Design strategy, Innovation, Product design, User centered design, Enabling design, Information society, Ecological approach

1. INTRODUCTION

New technologies, innovation strategies and changes in consumer behavior have an influence on the role of design in industry and society. This applies especially to the design for information and communication technology that is influenced by the inherent flexibility of software technologies and greater opportunities for users to collaborate through the Internet. Parallel phenomena are visible also in the design of physical products and environments. Several design scholars and practitioners have recognized these changes. For example, Richard Buchanan (2001) described them by introducing new categories of design objects; John Thackara (2005) presented a set of design frames to grasp the challenge of designing for the complexity of the present world; Tom Kelley and Jonathan Littman (2005) approached contemporary design at IDEO through identifying designers' new roles and in a recent doctoral thesis Anna Valtonen (2007) described the evolvement in design profession in Finland.

Buchanan (2001) classified design objects into four categories, which are related to corresponding design practices. The first two are *symbols* and *objects* designed according to graphic and industrial design traditions. The third category he calls *actions*. In the design of actions people, contexts and the social setting of applying technologies are in focus and encompassed in the extended concept of a product which is not just tangible, but includes functions, services and experiences. The corresponding practice is interaction design. The fourth category, environmental design, deals with human systems of applying information, physical objects and environments in work, play, leisure, and learning. Environments are not directly perceivable, but intangible ideas, thoughts or concepts that set frames to our practices.

John Thackara (2005) approaches the changing scene of design by introducing a set of design frames. His frames recommend design strategies such as genuinely recognizing the insiders' point of view, enabling people to create meaningful solutions for themselves, the importance of comprehending local contexts, and exposure to rich variety of influences in design. Complicated systems should not be designed and left for people to cope with, but they should be gradually developed in context and in a case sensitive manner in collaboration with the users. This should be done by building on available knowledge and experience instead of always starting from scratch, as designers often prefer.

Tom Kelley and Jonathan Littman (2005) describe the contemporary design culture and service offerings of IDEO through designers' different roles. These roles, or personas as they also call them, are divided into three main categories. Personas responsible for learning are anthropologists involved in user studies, experimenters

creating and testing prototypes, and cross-pollinators who scan and transform ideas across discipline and industry boundaries. Organizing personas manage design: Hurdlers fight against practical challenges like funding and technology problems; collaborators enable teamwork between people coming from different backgrounds; and directors are responsible for the long-term development and the composition of teams. Building personas are closer to the traditional designer roles as they generate solutions, which include atmospheres, surprises, interiors and spaces, personal services, and meanings associated with designs.

Anna Valtonen (2007) studied the recent history of the industrial design profession in Finland. The main results show a deepening integration of industrial design with industry and society, and the increasing versatility of designers' competencies. Among other developments she recognized several new tasks that designers have taken up in addition to the traditional core tasks of product design. These include design management, user centered design and design for end-user experience, driving innovations, and contributing to corporate strategies. While new tasks have been taken up, none of the previous tasks has been replaced. As the two main trends within the profession Valtonen recognized a shift from operative concrete design to more abstract strategic work and an increase in specialization.

After Herbert Simon's (1996) work on the sciences of the artificial one can hardly say that regarding design – also defined as a professional activity – as an extremely broad concept would be a novel idea. However, the above-cited authors have a message in common: the expansion of design, its growing social and business responsibility and increasingly collaborative nature are things that have a real impact on design practice and that the impact is linked to changes in the socio-technical preconditions of design. The spread of design to new disciplines and the novel challenges taken up by designers are good indications of the vitality of the profession and the strength of design based problem solving, but these changes can be disorienting. Scholars in need of specific terms, faculty members in charge of design curriculums and design directors responsible for developing competences and organizing design functions may become confused. This paper aims at reducing this confusion by providing two new concepts for mapping design activities: *immediate design* that refers to planning and problem solving activities close to people and their daily challenges, and *remote design* referring to longer term development of preconditions for future design solutions.

2. OBJECTIVES AND METHODS

The objectives of this paper are, first, to describe some current trends, i.e. design tensions, in design that are stretching the limits of the practice. Second, the paper introduces a triad model of design that is potentially

useful in understanding these changes. Third, it discusses some possible ways to utilize the model in the future development of design business and education.

The work, based on which the model is presented, was conducted in a cross-disciplinary project, *Ecological Design of Intelligent Environments* (ÄES), in Finland during 2005-2006 (Kaasinen and Norros 2007). The purpose of the project was to address future demands that ubiquitous computing and the information society will place on user-centered design. The project proceeded through a series of project meetings, workshops and virtual discussions, with contributions from academic project partners bringing expertise in computer science, computer supported collaborative work, usability and user experience, cognition science, ergonomics, occupational psychology, and industrial design. In addition, a steering group brought contributions to the project from energy, health care, industrial automation, entertainment, telecommunications, sports monitoring and software industries.

The project agenda was structured around the so called ecological approach to design, which in our vocabulary did not refer to ecologically sustainable design or green design, but to linking technological change with social practices. It refers to an attitude of perceiving phenomena in human-technology systems from the point of view of relationships and interactions. According to the ecological approach, environments should be understood from the point of view of the practices that they enable, and their quality refers to the development potential of the human, social, physical and technical systems as a whole. The approach emphasizes the potential of technologies to create new relevance by merging with each other, with non-technical environments and human practices. Thus, the objects of design should not be understood as technical devices or even isolated interactions between humans and products, but as broader practices. Widening the objects of design allows more comprehensive understanding about the motivations, routines and values behind human actions. It pays attention to the circumstances where interactions take place, and where the environment enables, adjusts and restricts interaction (see Flach et al. 1995, Vincente 1999, Norros et al. 2007, Kuutti et al. 2007). Theoretically the ecological approach is based on James Gibson's (1979) ecological psychology and Urie Bronfenbrenner's (1979) ecological developmental psychology. It also borrows from cultural historical activity theory (e.g. Engeström 1999).

The cross-disciplinary discussion followed partly a dialogue based work conference approach (Gustavsen 2000, Vartiainen and Pulkkis 2004) and was rather informal. The academic participants and practitioners continued the dialogue over the first 18 project months and recognized several themes that characterize present trends in the design of complicated information systems and environments. These themes were recorded on work conference memos, interpreted and reinterpreted in numerous discussions and

complemented with references to the literature. Thus, instead of a formal analysis relying on a single method the themes were consolidated through a dialogical process. On this ground, the author presented the *design tensions* and then a *triad model of design* as will be introduced below.

3. RESULTS

As discussed in the introduction section above design products, the frames of design activity, designers' roles and the design profession are changing. Several trends have been recognized by the above cited authors and project ÄES. What seems to be characteristic to them is that the evolution paths are not parallel. On the contrary, whenever a trend illuminating a change of design is found, an opposite trend can immediately be identified and traditional design practices remain in between these emerging ones. In this situation the tensions, which the opposites set on design stretching the discipline simultaneously to opposite directions, can be seen as more descriptive than the coherent trends themselves. Following this logic a set of five design tensions of information society will be presented below. All of the tensions have their roots in existing design practices, but forthcoming developments are expected to increase and intensify them.

3.1 TECHNOLOGY TENSION

Ubiquitous information society can be seen as a technology trajectory characterized by comprehensive and widespread utilization of communication technologies, advanced interaction methods between humans and technology, and algorithmic intelligence. Connectivity becomes an increasingly universal feature of artifacts and consequently a standard phenomenon in our environment. Human-machine interaction is seen to develop towards so called natural interaction including speech and gestures, and it enables control on high levels of abstraction. Algorithmic intelligence refers to technical systems' capability to learn, to anticipate and to take initiative in adapting to changes. These visions allocate technical solutions responsibilities over increasingly complex systems. (see Aarts et al. 2003, ISTAG 2006, Kaasinen et al. 2007)

One of the most fascinating objectives with ubiquitous technologies is to hide the technology, make it invisible and just to provide the services, utility and experience (Weiser 1993, Norman 1998). Ironically, working on the meaning and hiding the technology may make the technologies peripheral or even completely unnecessary. John Thackara's (2005) example about the "walking school bus" demonstrates this clearly. School children walk to school together escorted by a "driver" who is an adult walking with them. The "bus" provides a clever combination of safety and exercise that traditional methods of taking a bus or walking alone could not deliver.

When genuinely paying attention to needs, meanings and utility, just redesigning practices and improving the utilization of existing means can create the desired improvements. All the clumsiness with technologies is avoided, because there are no new technologies to be introduced.

A good indication about strong focusing on meaning and human practices in design, instead of technologies, is the spreading interest in design tools that address behaviors rather than products. These include for instance scenarios, acting based design approaches, and design games. Many of these methods have been developed to make sense of the possibilities of modern technologies but while doing that, they direct attention away from the technology.

3.2 INNOVATION TENSION

Creating completely new solutions from scratch is an ideal challenge loved and appreciated by designers. The emergence of new information technologies enables and attracts designers to present disruptive innovations and these are what the visions of ubiquitous world have promised: technology does not only provide us with better tools but enables completely new behaviors and experiences. Radical innovations changing our perception of products are also what the innovation literature regards as the key business objective (e.g. Kim and Mauborgne 2005). However, existing structures impose restrictions and create unavoidable connections to the present and the past. The designers of the ubiquitous information society in particular need to acknowledge this, because ubiquitous technology is by definition networked and, thus, compatibility comes to be a major issue. Compatibility with new technologies is not enough, and matching novelties with traditional technologies such as housing solutions is necessary. As information society is seen to penetrate into all areas of human life, the interface between technology and the human domain grows to be as multidimensional as the environment where we live and, thus, radical innovations need to be linked to the innumerable historical layers of prevalent technologies and practices.

The ubiquitous nature of information society makes it obvious that the designers in any given project will have only partial, often very incremental, control over the system as a whole. All designs will be part of existing systems just like any single new building will be a relatively small part of a city. No single actor – however big and powerful – has enough competence, resources nor insight to implement a complete solution. Shared initiative and responsibility become necessary preconditions for development, and development initiative spreads from industry leaders and their laboratories to suppliers, customer organizations, universities, and user communities (Kiljander and Järnström 2003, Chesbrough 2006, von Hippel 2005). Shared responsibility is, however, possible only if there are universal development platforms. These needs to be relatively stable and

accessible for a wide range of contributors to learn, to allow time for design evolution and to guarantee that the development efforts do not become suddenly obsolete.

Summing up, while aiming at radical innovations with ubiquitous technology, the development platforms enabling the change need to be stabilized. Mechanisms for updating infrastructures and facilitating the dialogue between social change and technical development need to be created to ensure the integration of technical and social development. Designers' reality in a ubiquitous world, which first looks like an adventure, may turn out to be routine work ensuring the compatibility of solutions that will often be launched as rather mundane updates.

3.3 COMPETENCE TENSION

The ecological approach to design underlines the importance of focusing on practices that include the technology and users both understood in a broad manner. This requires designers to be able to understand and influence complicated intertwined socio-technical phenomena. They need to apply research-based approaches though these may perhaps not follow exactly established models of academic research and knowledge creation. Research in the design context requires transdisciplinary concepts crossing the boundaries between technical sciences and humanities; it links knowledge with practice and context where it is created; acknowledges the versatility of knowledge creation processes and the versatility of participants; believes in reflective creation of knowledge and emphasizes its social relevance. Thus, research for design seems to closely resemble what Gibbons and colleagues (1994) meant with mode 2 in research (Norros et al. 2007). And indeed, the design community is actively working to develop a more research driven culture with research conferences, journals, textbooks, academic centers, institutions and especially with designers with advanced research competences and qualifications.

However, even with advanced design research approaches the complexity of human-technology systems cannot be understood independent of the insiders' views. Insiders' views are needed for comprehensive understanding of local practices. The development towards ubiquitous information society is also a big social change. That is why the solutions concerning the information society may not be formulated only on a technical or economical basis. The development needs to be guided by shared values and principles of righteous social development. On the level of design methods this means increased transparency. When we pay attention to the competences that are required from the participants, we realize that we have to look at two opposite directions. On the one hand we will see design researchers who approach the challenge with scientific methods the sophistication of which goes beyond traditional design exploration, and on the other hand there

are laymen with their expertise grounded in specific practices. Recent well-known advocates of trusting ordinary people as innovators include for instance John Thackara (2005), Eric von Hippel (2005) with lead users, and Charles Leadbeater (2004) with ProAms.

3.4 READINESS TENSION

The ubiquitous technology vision includes an idea about technologies that are prepared to serve users by taking an initiative for proactive action (Tennenhouse 2000). The ecological approach to design emphasizes that technology becomes complete and meaningful only through complex processes of adaptation sometimes also called domestication (Silverstone et al. 1999). The meaning and role of technology will depend on users' ability to combine it with other means and everyday practices. Taken further, the adaptable nature of technology can be seen as challenging the traditional division between design, implementation and use. It emphasizes the open, non-complete nature of technologies providing users with options to design for themselves, and it makes developers design for flexible and smooth handover between design, production and use.

Traditionally a well-designed product has been considered to be a ready-made solution capable of serving the users and fulfilling their needs without too much maintenance or adjustments. The vision about ubiquitous environment stretches the requirement for readiness to proactive anticipation, action without waiting for the users' decision. However, completely finalized solutions exclude the options for adjustments by users, which is on the other hand seen as an essential feature of the information society. The ideal design would be one that is a permanently unfinished, stimulates new interpretations and provides opportunities for adjustments (see Fisher et al. 2004). Consequently, the ideal readiness of design will be polarized between context sensitive super readiness and open do-it-yourself kits.

3.5 GENERALITY TENSION

As discussed above, according to the ecological approach, solutions become understandable and relevant only in specific practices and contexts. The quality of the solutions can only be assessed within these practices and from the point of view of those who are involved with their values and attitudes. This forces designers to the field to the immediate proximity of the users and practices, and it forces the designers to be situation specific with their solutions. The design of a piece of equipment for a complex environment, for example, an operation theater without comprehensive understanding about users' collaboration, competences, stress levels,

newly changed treatment practices as well as the other devices used simultaneously complementing each others would be very unwise. Indeed, we have witnessed good examples of such practice bound projects and methods that are based on ethnographic approaches and collaborative design. At the same time, however, designers' work is getting more abstract and conceptual (e.g. Valtonen 2007). To create preconditions for the design of advanced technology products companies utilize design on more strategic levels where, instead of working on products directly, designers influence product portfolios, stakeholders' attitudes, competences, tools and regulations (e.g. Keinonen 2006, Mutanen et al. 2006). And it seems that these strategic challenges of design are getting more and more attention. Increasingly numerous designers work on creating prerequisites for design through research, education, administration, strategic planning, etc. and consequently relatively fewer designers work under the traditional core meaning of design.

Designers simultaneously get closer to the users to solve their specific local problems and keep a distance from them in order to anticipate and enable activities dealing with more and more abstract design questions.

Technology driven design	← **Technology tension** →	Technology averse design
Radical innovation	← **Innovation tension** →	Update innovations
Researcher designers	← **Competence tension** →	Layman designers
Proactive readiness	← **Readiness tension** →	Do-it-yourself readiness
General enabling design	← **Generality tension** →	Design for specific practice

Figure 1. Trends in the design of complicated future environments and the tensions they create to design discipline.

Figure 1 summarizes the recognized trends in the design of complicated systems and the tensions they bring to design discipline. It is worth noticing that much of what is presented above as challenges for the present and the future has already existed and influenced design for long in some form or magnitude, and that the flexibility of the design discipline has digested the changes. However, acknowledging the trends and viewing the field of design accordingly makes it possible to increase our understanding about design and its potential. The discussion has leaned on ubiquitous information technology as the other source of complexity. Most likely similar tensions will appear if the technology base is changed to another one, let us say biotechnology, as long as the versatility of technical options and their multiple connections to human practices remain.

4. IMMEDIATE AND REMOTE DESIGN

A common feature of all the above-described tensions is the existence of two simultaneous main trends: one approaching users and specific local practices (the right column in figure 1) and the other distancing from them in order to shift to more generic questions about creating preconditions for design (left column in figure 1). Both of these have a major impact on what design professionals are supposed to know and do and, thus, are changing the nature of the profession. It is also fair to assume that known design practices and competences will remain relevant. Along with these observations, it is suggested that two emerging modes of design, *immediate* and *remote design,* could be conceptually separated from *product design*. Defining immediate and remote design as separate practices saves product design from fragmentation and conflicting requirements. For product design, including the design of physical products and stand-alone software systems and corresponding artifacts, it is enough to focus on its core processes and specify the interfaces between immediate and remote design to ensure adequate understanding about the practices, strategies and platforms. Immediate and remote designs are described below in a slightly optimistic tone describing them, as they would ideally appear.

Immediate design is characterized by responsiveness to users' current needs, intensive layman participation, continuous incremental improvements, and the utilization of open do-it-yourself development platforms. It takes place where the activity and challenge are, on the site, and aims at solving the problem directly without withdrawing to product development fortresses. In addition to being *immediate time and location wise*, it should be *immediate causally and in status*: users' explicit and implicit needs are the immediate reasons to which the design responds, rather than a business strategy or technical opportunity. In immediate design collaboration, the designer is one of the insiders fighting in the same trenches with the users. Immediate design links the design activities directly to the practices, which makes it specific and context dependent. Work to improve the environment and normal work to complete tasks can intertwine and merge in immediate design. Immediate design applies existing technologies and adjusts novel technical innovations to human systems and structures. Because design is based on available components and platforms, it is relatively easy to experiment with, adjust or reject options. An example of immediate design practices might be a project, like the one IDEO completed with DePaul Health Center (Kelley and Littman 2005), where designers work for a central hospital improving the personnel's' working environments and patients' experiences in intensive collaboration with the both. These designers would not develop new products, but design how technical means could be applied to enhance the hospital practices.

If we asked which would be the present design practices that fall under immediate design, we would recognize several. First, users themselves are responsible for the majority of immediate design. They decorate their homes and adjust their PCs. Second, innumerable activities at offices and factories where experts in technical support and maintenance units adjust tools and environments belong to immediate design. Understanding the local requirements of work is so essential that these decisions cannot be made anywhere else but in the context. All these can be regarded as design activities, even though they remain outside of the prevailing conception of design seen as a professional activity. People have been able to cope with this kind of domestic and occupational design challenges, but the penetration of advanced information technology will complicate immediate design tasks, make professional expertise more urgent, and gradually move more and more decisions under the professional design umbrella. Third, traditional design services falling close to immediate design include, for instance, interior design and tailored information systems because of their case specificity. However, they do not necessarily incorporate all the principles of good immediate design such as insiders' point of view and collaboration. These kinds of context specific design services have been based on specialized skills such as ability code or developed insight in visual style, which have been applied in a generalized manner without always being very sensitive to local practices.

Remote design aims at creating structural changes. Highly specialized design professionals aim at general solutions, principles or understanding over individual contexts or implementations. Remote design creates conceptual, methodological, regulatory, competence or resource related foundations for others to develop products or local practices. When remote designers' conceptual work turns into more tangible design, the results are either concepts meant for decision-making, learning or influencing or they are models for generic design platforms that will be adjusted before becoming useful for end users. Remote designers' scope of interest in time and coverage is broader than that of immediate or product designers. Strategic design is an expression sometimes used to refer to similar kind of activities as meant by remote design. These include design and innovation management, design of development platforms and infrastructures, and design competence development in industry (Keinonen 2006). Remote design can, however, be interpreted to include enabling design taking place in settings other than industrial organizations, that is, within education, design research activities, design promotion in the media, design administration and regulative activities related to products and environment. These kinds of activities are not well covered under what is usually understood by strategic design. So, remote design is distant from users' immediate needs in terms of time, location, reason and status, because its impacts incarnate as something tangible much later, the designers work away from the field in industrial and administrative superstructures and they take their actions based on rather generic phenomena in society. An example of a remote design project might be MIMOSA project where research units studied,

designed and published new models for mobile interaction based on RFID technologies to be perhaps later adopted by terminal manufactures, service providers, and users (see Kaasinen et al 2006).

If we focus on the organizational environments and practices to which the different modes of design belong to, we can draw an image like the presented in figure 2. While product design typically belongs to the contexts of product development and marketing in manufacturing organizations or their suppliers, immediate design can be seen as a function in organizations applying technologies. Positioning remote design is more difficult because of the several different roles it might take but in all these roles it is linked to administration, enabling activities and control on higher levels of abstraction than the other two modes.

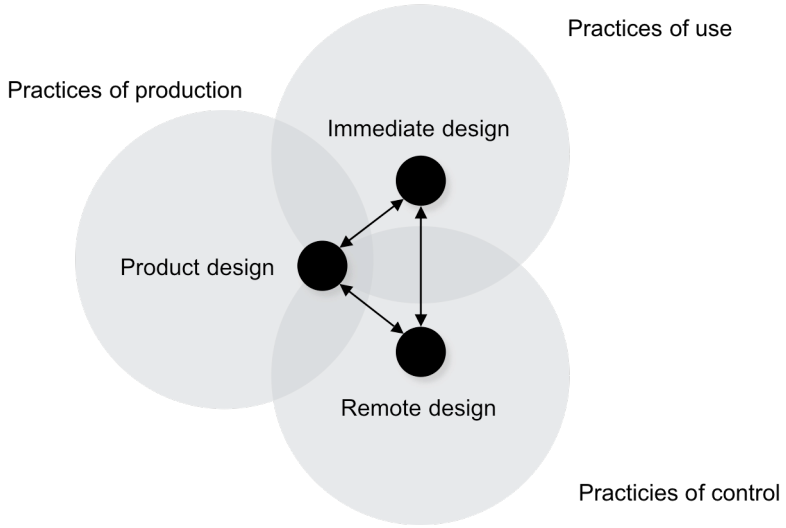

Figure 2: Environments of immediate, product and remote design.

5. DISCUSSION

The concepts of immediate and remote design have been formulated to grasp several essential developments in design and bundle them into coherent packages. However, reality is often not coherent and all activities under design do not necessarily fall easily into one category without any resemblance to others. For instance, product designers will every now and then be involved in immediate design kind of activities when collaborating with users to understand their practices and future needs. Also remote designers may need information about users' behavior as an input for more generic design models or strategies. Professionals temporarily crossing over boundaries to work on other professional areas is a necessary part of working life and it neither can nor should be limited with conceptual fencing. In interpreting to which segment of design individual activities belong to, in case this is relevant, primary interest and organizational frame should be

applied as the crucial criteria. If involving users aims at generic solutions, models or guidelines, and only secondarily or not at all solving users' specific problems, the activity only looks like immediate design.

In addition to analyzing and categorizing present design activities the ideas of immediate and remote design can be deployed to conquer new ground for design as illustrated in figure 2. Design has traditionally worked in the context of production and marketing. The dominating business logic for designers' customers has been to sell design products for others to apply. The models of immediate and remote design enable us to imagine also other possible organizational contexts for designers to work in. Engineers are often responsible for running and developing factories, not just engineering production machines for sale. Similarly immediate designers' skills could be utilized in running and developing human technology practices for and within organizations needing those themselves. Would an airport need continuous development of its technology and service practices? Would the police have similar needs, or day care centers? Immediate design in these kinds of organizations would not be just about changing the object of design from products to product-service systems, but replacing *design for them* with *design for us*. Remote design is close to business development, industry level strategic planning and society level decision-making. Remote designers could be affiliated in addition to manufacturing companies to retail, business consulting, research institutions, civil administration and the media. In these positions designers would contribute to industry and society level development of material culture on an essentially more abstract and generic level than in traditional design positions.

Adopting the idea of immediate and remote design would have influences on designer education. User centered design, collaborative design, and change management are obviously key issues for immediate designers to master. Because design solutions are created utilizing ready-made objects and development platforms, product design skills would not be needed, and thus omitting them would lighten the immediate design curriculum. In contrary, deep understanding of the domain of specialization and the technologies within comes to be a new requirement for immediate designers. An immediate designer might for instance have a double degree in industrial design and gerontology, and work for a nursing home institution developing care practices and environments. Or she might have degrees in paper technology and interaction design and work for a paper mill developing automation systems, interfaces and working routines. Remote designers approach design as a more conceptual issue. They need to understand about value creation through design, linking design with business management, innovation and culture. Design, engineering and business have already been recognized as related fields and cross fertilization across faculties is reality in several universities like in the International design Business Management program in Helsinki (IDBM 2007) or Integrated Design Innovation Group at Carnegie Mellon University (IDI Group 2007). Also other educational innovations to create

competences for remote design can easily be imagined. Combining design and law studies would be an asset in working with standardization, product liability issues, or user centered approach to legislation.

We can notice that immediate designers could find collaborative partners through horizontal integration in several industries applying design in complicated human-technology systems. Remote design integrates design activities vertically perhaps within traditional industries but on higher levels of abstraction. In education the integration can be implemented in the form of designers specializing in other disciplines, or other professions including design into their curriculums. Design, especially immediate and remote, does not need to be done by designers, but design skills are necessary.

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