MINDFUL DESIGN: APPLYING THE MINDFUL DESIGN APPROACH AT INDUSTRIAL DESIGN LECTURES

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ABSTRACT
This paper aims to present teaching strategies applied to the Mindful Design approach in the TU Dresden industrial design curriculum. The main focus of this study is the implementation of Mindful Design on industrial design in a higher education context, which can be understood, applied and evaluated by design students.
The concept of Mindful Design has been introduced by Niedderer [1] to describe how design products can promote and improve mindful attention by disrupting the user's interaction during social activities. The authors comment that Mindful Design can be related to behavioural change and widen the understanding of social cognitive mindfulness through modifying expected functions of product use.
In this paper the authors describe the importance of applying the Mindful Design approach to product design to propose improvements of cognitive performance as well as cognitive impairments, self-regulation and subjective well-being to final users. This paper takes as its case study the methodology of designing for people with dementia.

Keywords: Mindful Design, tools, design education, teaching strategies

1 INTRODUCTION

Beyond mere product development, design must aim to provide human needs and fulfilment. Due to the variety of people, needs and traits or contemporary context situation, there are different design approaches which may fit with every aspect of different groups, contexts or needs. Taking into account that it is not possible to consider every human need in depth in one specific design approach, the existence and application of diverse methods which affect the diversity of contemporary issues is mandatory.

As an example, the User Centred Design approach has been successfully applied to intervene not with just functional people needs (like ergonomics) but assembling subjective issues (emotions, symbolic, semantics) to the achievement of the user's satisfaction. In design education some design approaches have been taught, methodically and systematically, offering design students the possibility to choose which a particular design approach which is suitable for the specific design problem they are focusing upon. Those design approaches include User Experience Design [2], emotional design [3], Participatory design and Co-creation [4], Product Service Design [5] among others. Mindful Design [6] is another specific design approach among the ones just listed. This paper explores in particular, how the Mindful Design approach can be taught to industrial design students when applying it to designing for people with early stage dementia?

2 MINDFUL DESIGN

2.1 Mindfulness and it's streams

Literature points to two predominant western streams of mindfulness research and practice: meditative mindfulness for stress reduction [7] and socio-cognitive mindfulness [8]. One stream, from philosophical secular traditions of Buddhism, defines mindfulness as 'the awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment' [9 p. 145]. This approach considers mindfulness as positively

affecting attention that would increase along the process of maintaining the meditation in everyday practice [9]. The other, western stream of the literature defends the commitment to the notion of being aware of the present moment, related by Langer's studies on mindlessness and choice. But this approach presents mindfulness as the process of actively making new distinctions by not relying on automatic categorisations [10]. Langer explains, mindfulness is updated by maintaining an orientation in the present, alertness to distinctions, sensitivity to different contexts, and an openness to novelty as well as creativity [11].

Langer's [12] studies suggested that Mindlessness is an inactive state of mind characterized by reliance on distinctions, categories drawn in the past: the past over-determines the present, trapped in a single perspective, insensitive to context, rule and routine governed, typically in error but rarely in doubt. In contrast, by practicing Mindfulness as active state of mind characterized by novel distinction-drawing that results in being situated in the present, sensitive to context and perspective, rule and routine guided, phenomenological experience of engagement. Noticing novelty reveals uncertainty. Langer also confirms, proven by her studies, that living in a mindless mindset for a long period of life can increase the chances of health problems, lack of creativity and vitality. Most of human suffering, psychological and physical is the direct or indirect effect of mindlessness. For over thirty-five years in study after study, Langer increased her theory about mindfulness and has found measurable benefits to creativity, competence, psychological well-being and physical health.

Awareness studies have been a relevant and useful model from a field called Interpersonal Neurobiology. This field explains the science behind the notion that the inner-appeasement and self-regulation of mindfulness actually fosters interpersonal benefits [16]. The neurobiologist Daniel Siegel (has highlighted on his studies about Mindful Awareness, the promotion of well-being due to three elemental practices: secure attachment, mindfulness and effective psychotherapy. Siegel's unifying theory shows that the effects of these three experiences have similar neural mechanisms [14].

2.2 Mindful Design = Mindfulness + Design

The application of the socio-cognitive mindfulness in design by Niedderer [6], [15], also termed mindful design, refers to the attentiveness of the user towards the consequences of their actions performed with an object [10]. Niedderer affirms in her studies that an artefact can be designed in such a way that it stimulates mindfulness where a mindful context is not available [15].

Among the subdivision of Mindfulness, Niedderer based Mindful Design on the studies of the socio-cognitive branch, where it denotes mechanisms such as social engagement, flexibility with others and the context, search for novelty, production of novelty and curiosity cited by Langer [12] in her studies. This approach of Mindfulness is stimulated differently by traditional meditative practices, consciously reformulating the way of thinking and acting. Lately, Niedderer [15] exemplifies performative object for mindfulness, which have the effect to disrupt user consciousness to automatic action and requires an additional prompt to make the user aware to complete the action, as in the design of games or safety devices such as warning notices on computers [10]

2.3 Introduction of Mindful Design in design higher-education

In between several learning theories raised in the literature review, the "Experiential Learning Theory" from Kolb [18] is broadly accepted for design education, which makes this theory suitable to teach Mindful Design to industrial design students. This theory describes learning as a process whereby knowledge is created through by actively transforming experience [18]. According to Yeganeh & Kolb [13], results from a study evidenced that mindfulness can be a transforming experiential tool in the learning cycle by asking 314 participants about their attention, awareness, openness during their learning process. Mindfulness, as commented, has already been applied in Kolb's learning cycle to improve students' focus and attention to their learning. But, as a challenging teaching task, how to make socio-cognitive Mindfulness mechanisms applicable to product development by industrial design students? Which tools and methods benefit the transfer of Mindful Design to industrial design education?

This paper aims to discuss the teaching methodology proposed to achieve the teaching and learning goals on design students understanding the mindful design approach and its application.

Kolb's learning cycle theory has been widely credited with launching the modern learning styles movement in 1984 with the publication of Experiential learning: experience as the source of learning and development. According to Kolb [17 Chapter 2, p. 49]: 'learning is the process whereby

knowledge is created through the transformation of experience'. Knowledge results from the combination of grasping experience and transforming it. Effective learners need four kinds of ability to learn: from concrete experiences (CE); from reflective observations (RO); from abstract conceptualisations (AC); and from active experimentations (AE) as represented in figure 1. These four capacities are structures along two independent axes, with the concrete experiencing of events at one end of the first axis and abstract conceptualisation at the other. The second axis has active experimentation at one end and reflective observation at the other [18, p.36]. At the figure 1, this process is portrayed, with suggestion of methods, as an idealized learning cycle or spiral where the learner "touches all the bases" – experiencing, reflecting, thinking, and acting – in a recursive process that is responsive to the learning situation and what is being learned [20].
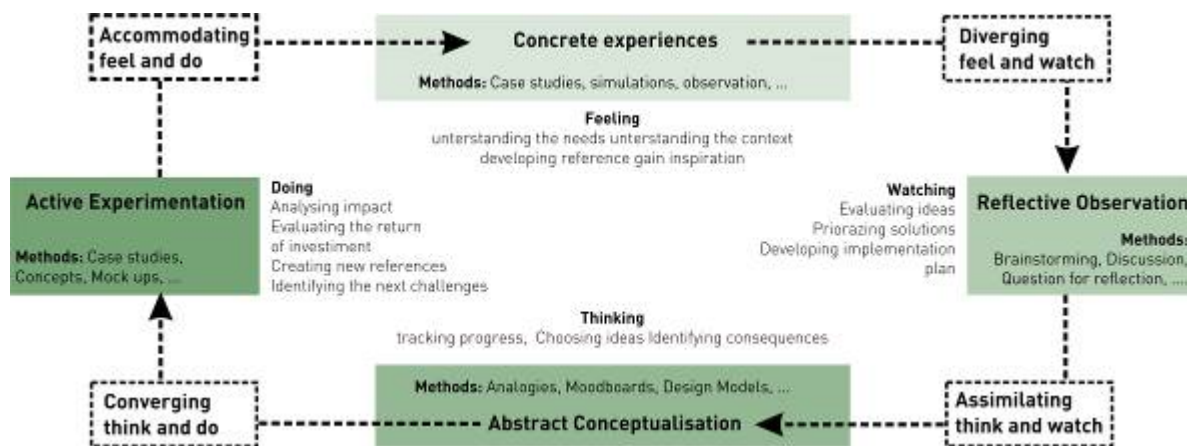

Figure 1. Experiential Learning Model adapted by Kolb [18],
added learning methods from Schmitt & Domingues [19]

The course of Industrial Design curriculum at the TU Dresden roots back to the 1950s and is placed as a specialization within a modularized diploma course in mechanical engineering [21]. Industrial Design shares its special arrangement within the programme of the Faculty of Mechanical Engineering with other disciplines, such as ergonomics. The students have already passed undergraduate courses in engineering when they start specialising in (user-centred) industrial design in graduate courses. Due to their prior studies in mechanical engineering as well as due to the framework of an academic university, the courses blend strong methodology and rigour with attention to sensibility for syntactic and semantic qualities of products and services [22]. The pedagogic approach in industrial design curriculum applied the constructivist teaching strategies. Accordingly, the focus lies on what learners build their own mental structures when interacting with an environment. The pedagogical focus is task-orientated, self-directed activities orientated towards design and discovery. This pedagogical approach is useful for structured learning environments, such as simulated worlds, construction of conceptual structures through engagement in self-directed tasks [23].

The Mindful Design approach involves looking at opportunities and people's capabilities as design methods like participatory and user-centred design. This includes people evolving at the project, users to co-production for the different stages and aspects of the project, and their roles and requirements in the process [24]. The Mindful design approach has further considered well known design tools which include Personas and SAP Scenes [25] for analysis. For the conception and evaluation-phases of the process, and Mindful Design Criteria, method developed by the authors for the conception-stage, they present a new tool to support and guide students during the design process which leads to successful mindful design concepts.

Mindful Design Cards (Mindful Design Criteria) - A set of visual cards with the description of Mindful Design parameters/dimensions helps students during the conception and design phase as well as self-evaluation of their design concepts. The design and instruction of the cards have been generalised to be as simple and easy to follow. Neutral and abstract references to the mindful design criteria which are: *Engagement, Novelty seeking, Novelty producing, Awareness and Attention* were used during definition and evaluation phases. The Mindful Design Cards serve as pedagogic resource aiming to support students to follow Mindful design criteria during the design and their learning

process. As a teaching tool, students can correlate the meaning of each criteria and a Mindful Design case studies. It helps students to notice which criteria every example is related to Figure 2 and 3.

Figure 2. Students working with Mindful Design Cards during the lecture

Figure 3. Picture of the back of Mindful Design Cards set

The main goal of the lecture is introduced, visual presentation to the students to the concept of Mindful Design approach, with literature review, case study, examples and a presentation example of how one´s students could apply their recently acquired information into a class activity with the aid of suitable design tools. It is expected the 90 minute programme will enable students to understand and apply Mindful Design approach to product development for the given target group. The lecture was planned according to Kolb's learning theory, for a successful learning cycle, the learner needing to achieve four kinds or learning: experiencing, reflecting their observations, thinking (abstract conceptualizing) and acting (active experimentation by doing).

Table 1. Lecture Mindful Design teaching strategies, Kolb learning experience strategies: concrete experiences (CE); reflective observations (RO); abstract conceptualisations (AC); and active experimentations (AE)

Activity Description	Tools	learning goals	time
Greetings		Ice breaking	2 min
Explanation the lecture procedure, Introduction, aims the lecture, Content, Evaluation questionnaire Pos-lecture (5 bis 10 min), Questions at the end of the lecture explanation, Discussion, Photo and video producing permission.	Visual presentation	Clarifying lecture goals and achievements(R.O.)	5 min
Mindful Design: practical example from disruption user's attention to be mindful of their environment. Discussion with the students, what they see on the examples. (comparison between Mindful Environment and cluttered environment provoking mindlessness or confusion.)	Visual demonstration (pictures of real cases)	(R.O.)	5 -7 min
Own Experience about Mindful Design and Mindfulness Question to student relating the content.	Discussion	student's pre-knowledge about the content (C.E)	5 min
Where is started: Mindful Design Mindfulness, performative object	Visual presentation	(R.O.)	5 min
Index the lecture	Visual presentation		2 min
Goals of the lecture	Visual presentation		2 min
What is Mindful Design	Visual presentation	R.O.	2 min
Mindfulness two streams: Meditative Mindfulness, Socio-cognitive Mindfulness	Visual Aids Presentation	R.O.	5 min
Mindfulness dimension: Meditative Mindfulness, Socio-cognitive - Comparison and similarities	Visual Aids presentation/	(R.O.), (C.E)	5-7 min
Discussion about the comparison and similarities with the next two colleagues. How do you think, which stream of mindfulness could be better transfer to product qualities? Why?	Small groups of student's discussion Visual Aids	Reflection and comparing both approaches (A.C)	10 min
One spokesperson of the group explains their findings, consensus to the class.	Write it down and speak about it.	A.C	20 min
Mindfulness and Behaviour Change	Visual presentation	R.O	2 Min
Mindful Design and its contexts	Visual presentation	R.O.	7 min
Mindful Design Criteria	Visual presentation		10 min
Group exercise with the Mindful Design Criteria Cards	Exercise	A.C	10 min

Examples of Project for people with dementia (Mindful Design)	Visual presentation	R.O	2 min
Learning about Mindful Design approach today. Which target group or scenario you can imagine M.D.A could be applicable?	Discussion	Feed-back (A.E)	5 min
Closing lecture; Questions; Break for the next step of the workshop	discussion about the outcomes the lecture		5 min

3   EVALUATION

Based on the theoretical review of learning theory considered in this paper, the structure of teaching plan was tested in order to observe issues such as: time pressure for explanation and application of tools, environment, teaching aids (presentation, data show, tools) were suitable for the achievement of the goals and answer of the research question: What do students learn from the lecture (reaching learning goals) in regard to the Mindful Design and its criteria? The material prepared for the investigation was: SAP Scenes, data-based Persona and Mindful Design Cards, based on the mindful design criteria developed by the authors, have been used for developing mindful product design concepts for people with early stage of dementia. In relation of the time offered for the design concept activity, the time for the lecture and the activity in 90 minutes was, in student's opinion and observation from the facilitator, appropriate for the understanding of the Mindful Design approach itself. One of the students mentioned: "Before I attended the lecture, neither I understood what Mindful Design was less how to apply it in design of products. Now I can affirm, I just didn't understand the meaning of the subject, but I think it is an interesting approach to apply at other target groups instead people with dementia". The results of expert evaluation of the students' concepts showed an overall positive effect of the design concepts on mindfulness of potential users.

4   CONCLUSION

The lecture goals of Mindful Design approach to be understood and applied by industrial design students were successful. Following the pre-study, several improvements have been made to the structure and content of the lecture, to methods, and evaluation methods for design mindful products for both students and experts. The authors agreed to experts' comments that for better results on the student's design concepts, more evidences are needed on drawing and describing these concepts, which were also successful applied to the first main investigation. The visual materials used in the lecture: Visual presentation with diagrams, pictures, animations and practical exercise with Mindful Design Cards set with examples of products and services for students to relate with the mindful design criteria as a reflective activity during the lecture. At the main investigation, the lecture was extended to a 4.5 hours workshop, in order to reduce time limitations on students' design concept development and use of the given design tools (SAP scenes and Persona). Summarizing, students had time to develop analyses of the problematic of the given scenario in the concept phase; some sketches of mindful design proposition for the given Persona were presented successfully. The purpose of this paper is not to criticize or develop a new teaching method to the industrial design course, but to identify within the already developed structure how to adapt and apply Mindful Design as a new design approach. Finally, the techniques and methods for the process of experiential learning embraced all four stages of Kolb's learning cycle delivering a better implementation on the Mindful Design approach in industrial design education.

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