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CUSTOMER EXPERIENCE INTERACTION MODEL

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1. Introduction

We suggest the Customer Experience Interaction Model (CEIM) to support the design of User Experience (UX). It provides a holistic view on the interaction of users with products. Therefore, CEIM incorporates different relevant models and views from the disciplines of engineering, human factors, industrial design and psychology. It supports the communication between developers by creating a shared understanding and a common terminology. Products that really meet the user's psychological needs can be designed only by combining knowledge of the mentioned specializations.

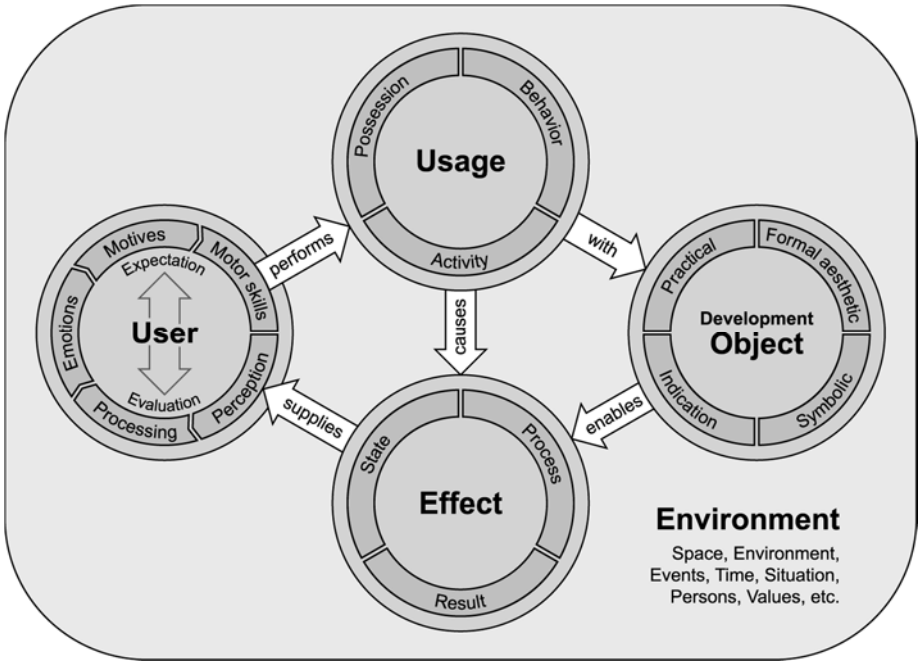

Figure 1. Customer experience interaction model

1.1 Motivation

Beyond usability, which has been item of interest in science and industry for several years, the quite young approach of UX extends the view on user product interaction by psychological aspects. The motivation of UX is to develop experiences via the product usage instead of just developing products. These have to meet psychological needs and motives of the user. Thereby, emotional reactions shall be triggered. That provides a unique selling proposition (USP) in mature markets of equal products with similar functions and technologies.

The term User Experience is understood in many different ways by several disciplines. The definitions and approaches range from a psychological to a business perspective [Roto et al. 2011]. The challenge is to bring these views and strengths together and to enable multidisciplinary development teams to effectively work together on UX. Mostly, psychological experts and competencies are missing in product development teams. This deficit needs to be considered when creating an approach to support designers developing or designing for UX.
We assume that UX in the interaction of a user and a product emerges when the effect of a usage meets the user's psychological motives and needs and fulfils or even exceeds his expectations. Different characteristics describe this effect: It can be the result of the interaction, the process of usage or the timeless state of possessing or regarding a product. Furthermore, different temporal aspects are meant to trigger an experience: UX can be anticipated before usage, momentary during usage, episodic after usage or cumulative over time [Roto et al. 2011].

1.2 Goal

The goal is to develop a model that provides a holistic view on user product interaction depicting all relevant aspects in order to support the creation of UX and thereby a positive emotional reaction of the user. Approaches from different disciplines of interest shall be considered and combined in this model. These influences are described in the **state of the art** in chapter 2. The model requires to have following characteristics:

- The model must be **explanatory**: Observable experiences with products must be illustratable. It must be able to help analyzing existing products and experiences. Thereby, it helps detecting and naming strengths, weaknesses, opportunities and threads of product concepts concerning UX. Moreover, the model needs to support the verification process of UX.
- It must be **prescriptive**: The model must be able to support the design of new product experiences. With its different elements it is meant to trigger the right questions and ideas to create UX through products. Therefore, it needs to be usable, understandable and acceptable by different development professions. It must help convincing developers of the idea of UX and trigger their motivation to finally design experiences.
- It must support interdisciplinary **communication**: In order to present experience related product ideas to different disciplines, it is necessary to illustrate them in an understandable and inspiring way. Storytelling, scenarios and personas are some methods to achieve that. The developed model needs to be able to support the generation of those forms of expression.

1.3 Customer experience interaction model

Based on the requirements the Customer Experience Interaction Model (CEIM) was developed to include the aspects of all regarded approaches to UX. CEIM is a cross-disciplinary approach to illustrate holistically causal connections in user product interactions. CEIM consists of five elements as shown in Figure 1: the surrounding **environment**, in which the **user** performs a **usage** with the **development object** causing an **effect**. Apart from the environment each element consists of detailed segments. Arrows illustrate the interrelations between these elements. The elements of the CEIM are described in chapter 3. A **case study** in chapter 4 clarifies the idea of the model.

2. State of the art

Basis for CEIM are the following approaches and models: The block diagram of human machine system by [Schmidtke 1993] provides a cyclic view on user product interaction with relevant inputs and outputs (2.1). The approach of [Schaub 2008] focuses on the human perception and action and thereby deepens the human element of the block diagram, picking up the cyclic characteristic (2.2). The Activity Theory (2.3) by [Leontjew 1982] as well as the approach to human performance (2.4) by [Rasmussen 1983] deal with the interaction of users and products and include the user's skills and motives. Finally, the product language approach (2.5) by [Steffen 2000] enlarges the view on products by expanding the functional term on user related aspects like aesthetics and symbolic functions.

2.1 Human machine system

The consideration of human interaction with products makes the discipline of micro ergonomics valuable for the targeted model to display relevant aspects of usage to UX. The purpose of micro ergonomics is a rational view on the human and his work task to adjust this task and the environment to the human's capacities. Adapting the work load to the human's needs reduces physical and psychological stress. This prevents failures and accidents. Schmidtke portrays the human machine interaction in his block diagram. Thereby he visualizes relevant elements to derive improvements of machines and environment [Schmidtke 1993].

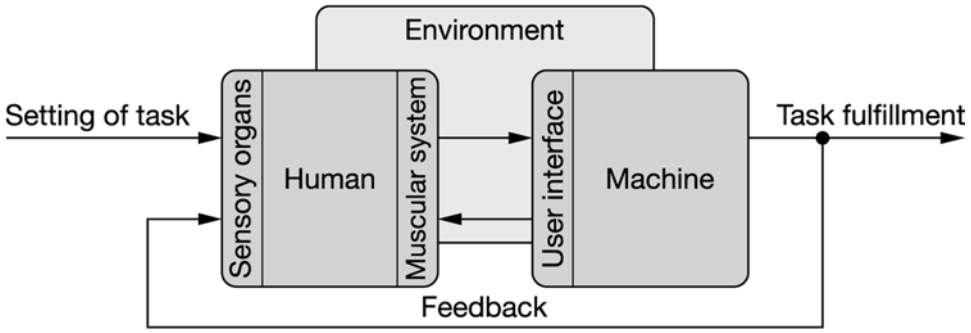

Figure 2. Block diagram of human machine system [Schmidtke 1993]

In the block diagram both human and machine are elements with an input and an output port. Input for the human are his sensory organs, called the **information receipt**. In the **information processing** stage this input is transformed and finally implemented in an output through the human's muscular system, mentioned the **information transfer**. Input for the machine are the control elements, output is the display. In this approach the environment appears in a physical sense as a disturbing element, hindering the human, the machine or their interaction. [Schmidtke 1993].

Interesting about this approach is the system characteristic of interaction and the well-defined elements with input and output ports. The closed loop circuit corresponds to real interaction patterns. Although, the representation of human is lacking psychological aspects like needs, motives, moods, resources and expectations [Roto et al. 2011]. Thereby the approach focuses on usability instead of a holistic user experience. Furthermore, the context just appears disturbing instead of also having a positive effect on the user's motivation and perception. UX may change when the context changes, even if the system does not change [Roto et al. 2011].

Relevance for CEIM: The block diagram is the basis of the illustration of CEIM. We took the general layout with elements: the human correlates to the user element, the machine to the development object and we adopted the environment element as a surrounding context influencing all elements and their interrelations, though not just in a negative way.

2.2 Human perception and action

Coming from the basic explanation of human machine interaction the process of human perception can be further detailed and explained. In general, perception is transformation of physical and chemical stimuli into information that can be psychologically processed to use it for controlling activities [Schaub 2008]. Based on and beginning with the signals perceived through the different sensory systems or modes (visual, auditive, tactile, vestibular and kinaesthetic) the process of perception comprises the enrichment of meaning of information through several steps of unconscious psychological processing of data. The temporal interplay of perception and activity can be explained by a chain of different phases as depicted in Figure 3.

Starting with an initial stimulus, a process of enrichment, amplification and combination of basic stimuli takes places and leads to recognition and realization in form of a feasible activity. While the perception of stimuli is performed by the different sensory organs, the activity, as reaction on the given stimuli, can again be performed through various modes (vocal, manual, etc.) [Wickens 2009] and can thus be perceived by other humans, the environment and the considered product or machine with its interface.

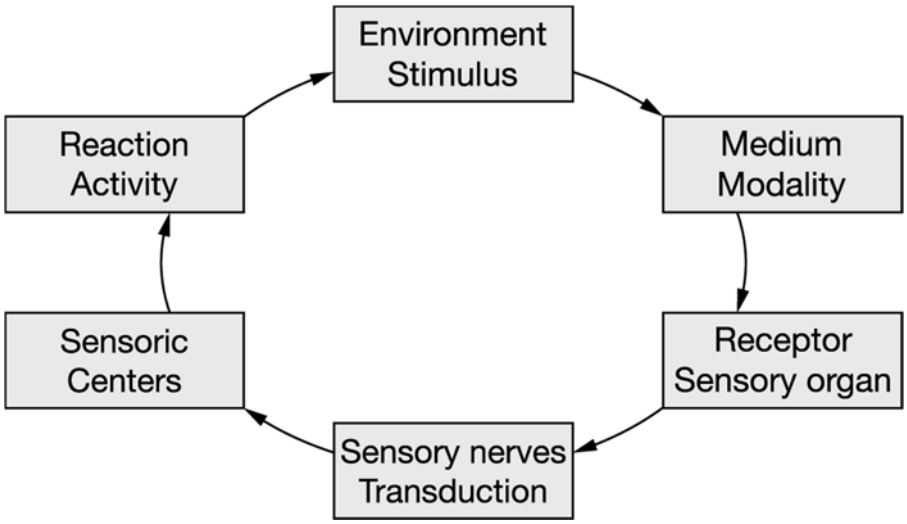

Figure 3. From stimulus to activity [Schaub 2008]

Relevance for CEIM: The block diagram of human machine system (described in chapter 2.1) already regards inputs and outputs of the user. However, this model considers the human rather as a technical object in an extremely reduced way. The approach of [Schaub 2008] enlarges the human perception and reaction and thereby provides more opportunities to describe occurent experiences.

2.3 Activity theory

Activity Theory is inspired by and based on the work of the Russian semiotican and psychologist Lev Semenovich Vygotsky, who argued against artificial separations between mind and behavior and between mind and society. Thus its principles consist of the meaning through action, the connection between the individual and the social, and the role of mediating tools [Gay and Hembrooke 2004]. Building on these principles a formal structure for operationalizing an activity system as a complex and multilayered unit of analysis was developed by Alexei Leontjew [Leontjew 1982]. Within his model any activity can be hierarchically decomposed into multiple actions that are performed to reach the overall objective. These actions can again be decomposed into operations.

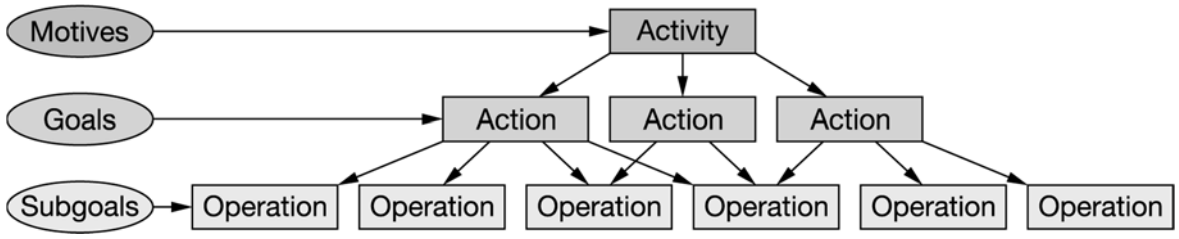

Figure 4. Levels of motives and activities [Leontjew 1982]

While activities are driven by a desired outcome and thus by consciously reaching for the fulfillment of ultimate objectives embodied by motives, actions represent partial activities that are driven by conscious intentional goals derived from this ultimate overall objective. Operations and sometimes sub-operations present the lowest level of elements where unconscious, often routine actions are carried out automatically in order to reach (unconscious) subgoals which together with the other operations serve the consciously chosen goal-oriented actions. Breaking down the system of activity (present on the highest level of composition) into the components of actions and operations is useful for identification purposes and relationships between subjects and tools.

Relevance for CEIM: Activity Theory provides an interesting matching of different levels of actions and the user's motivation. The hierarchical split-up of these elements helps differing several UX types in regard to a user product interaction. This approach can help naming precisely the actions or operations responsible for UX.

2.4 Human performance

Humans perform different kinds of actions in different levels of consciousness and skill, depending on their previous knowledge and experiences with the product. The usage of a product with a completely new interface concept can be challenging and in general demands a higher level of concentration and awareness. Positive as well as negative UX based on curiosity and play instinct but also on frustration and lack of understanding of the user can occur in those cases. An example is the touch technology in mobile phones: For the first smartphones this new interaction was a unique selling proposition and mostly fun to the surprised user. Nowadays, almost every customer expects this technology and just notices the lack of or missing touch display.

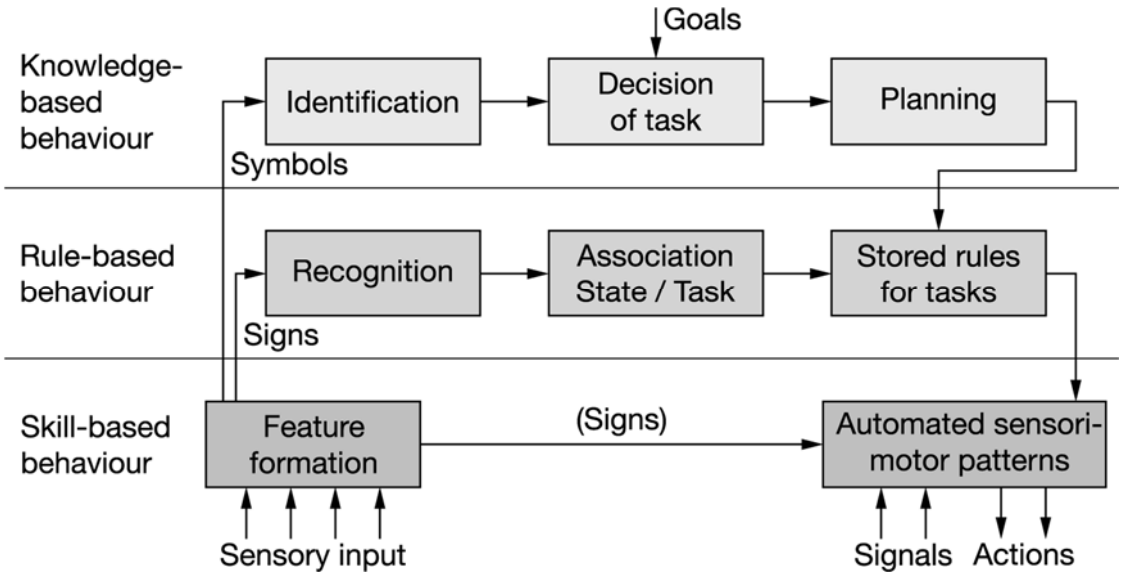

Figure 5. Levels of performance of skilled human operators [Rasmussen 1983]

Rasmussen describes the different levels of performance and consciousness in his approach as shown in Figure 5 [Rasmussen 1983]. The three levels of performance have the following properties:

- **Knowledge-based behaviour**: During unfamiliar situations, faced with an environment for which no know-how or rules for control are available from previous encounters, the control of performance is goal-oriented and knowledge-based [Rasmussen 1983]. The user needs to actively solve a problem-based on an analysis of the environmental status. Knowledge-based behaviour is normally the slowest operation.
- **Rule-based behaviour**: A familiar work situation is typically controlled by a stored rule or procedure which may have been derived empirically during previous occasions, communicated from other persons' know-how as instruction or a cookbook recipe [Rasmussen 1983]. Stimuli by the product or environment are assigned to memories of the user, where rules are stored for the task. Rule-based behaviour usually lasts shorter than knowledge-based, but still longer than skill-based behaviour.
- **Skill-based behaviour**: The skill-based behaviour represents sensory-motor performance during acts or activities which, following a statement of an intention, take place without conscious control as smooth, automated, and highly integrated patterns of behaviour [Rasmussen 1983]. This unconscious behaviour depicts an automatic action, which usually is not verbalized. Skill-based behaviour normally is the fastest operation.

A transition between performance levels can happen by learning, training or habituation of the user. This can cause a positive UX based on the psychological need for competence.

Relevance for CEIM: As shown in the example for mobiles and the discussion of transition between performance levels, this approach has an essential meaning for UX. Products must not overstrain undiscerning users nether bore skilled ones and must finally support a successful learning process.

2.5 Product language and functions

Mostly, product functions are seen as the purpose of technical systems [Ponn and Lindemann 2011]. Functions describe, what a system is practically good for. For example a chair provides an opportunity to sit on. Regarding the user's experience and emotions with a product, this view is insufficient. Beyond its practical function, a product can be desirable to a user by its formal aesthetic, indication or symbolic function. These aspects are subsumed as the product language [Steffen 2000]. They mainly influence the user's perception.

- **Formal aesthetic functions** involve shape, material, texture and color of a product, independent of the symbolic meaning. They correspond to the syntax of the design concept. The product's level of order and complexity is essential for the aesthetic view. They can be observed independently of content and meaning.
- **Indication functions** make the practical functions of a product audible and understandable. This pragmatic component of product language plays an important role concerning recognition, usability and self-explanation of products.
- **Symbolic functions** refer to the higher social context. Historic, socio-cultural and economical aspects influence these functions. They generate associations and conceptions in the users mind while acting with the object. It is about the denotation and connotation in context. With symbolic function users can show their status and belonging to other people with products. Both indication and symbolic functions depict the product's semantic part [Steffen 2000].

This approach is very valuable for a holistic view on user experience, as it covers all aspects of relevant needs a user can satisfy by interacting with a product. Important for UX are the properties designed into the product, the properties that the user has added or changed in the product or that are consequential of its use, as well as the brand [Roto et al. 2011].

Relevance for CEIM: Regarding the user's holistic experience with a product, not only its technical functions need to be considered and thereby illustrated in CEIM. The product language approach offers a sufficient view on functions, that can cause an emotional reaction in the interaction or possession of a product. Therefore, they are included in the development object element of CEIM.

3. Description of the model

In this chapter we illustrate the layout of the CEIM with its elements, segments and interrelations based on the approaches discussed in the state of the art. After providing an overview (3.1) we describe the surrounding environment element (3.2), the user (3.3), the usage (3.4), the development object (3.5) and the effect (3.6) of interaction.

3.1 Overview

As shown in Figure 1, the CEIM consist of five **elements**: the environment, the user, the usage, the development object and the effect of interaction. Except the environment, each of these elements contains several **segments** which divide the elements in more detailed aspects. Each of these segments can have a crucial impact on the UX and emotional reaction of the user. At the same time that means, that an occurent or planned experience cannot unequivocally be allocated at one specific spot in the CEIM for all kinds of UX.

Arrows represent different **interrelations** between the elements and show their dependencies. The user performs the usage with the development object. This usage causes the effect, which is enabled by the development object. The observable aspects finally supply the user's perception of the effect, which triggers an emotional reaction in the user and possibly motivates new actions. CEIM has a cyclic characteristic, there is no fixed start or end of causal connections.

3.2 The environment

The environment element involves all circumstances that influence the whole interaction, its elements and their interrelations. In excerpts it consists of the situation, other persons as well as the available time and space. In most interaction models the context only appears disturbing or obstructive to the interaction of user and product, thus has a bad impact [Schmidtke 1993]. We assume that the

environment's relevance on the generation of UX is very high (see [Roto et al. 2011]); hence it can have a positive impact on the interaction. In addition, the environment seems to be essential for the evocation of user's motives and goals.
So far, the environment element in CEIM does not have any further division in different segments, what does not mean, that this would not be reasonable. However, no suitable existing context model could be found in literature, that fits to the UX-related purpose of CEIM.

3.3 The user

For the user five aspects shall be considered: As mentioned in [Schmidtke 1993] the human user has an information receipt via his sensory organs, which equates to the human **perception** in [Wickens 2009]. The perception is carried out by the human senses: sight, hearing, taste, smell and touch. These recorded inputs are transferred to the information **processing** in terms of cognition and assimilation in the human memory [Wickens 2009]. The memories have a dynamic nature and are changing over time. That is why a momentary experiencing is different from the reflected and cumulative experience after a time [Roto et al. 2011].
By contrast to the user's expectation of using the object, the perceived and processed information supplied by the observable effect depicts the evaluation of the interaction. This evaluation and its comparison to the expectation can cause an emotional reaction. **Emotions** can be seen as a psychological reaction to events relevant to the needs, goals, or concerns of an individual. The focus of emotions in this model lies on the conscious part of emotions complete with attribution of its cause and identification of its object. The emotional segment includes human feelings or moods, emotions and affects. This distinction is temporal as feelings are long-lasting while affects are short-lived. Emotions arise immediately after the actualization of a motive.
Psychological **motives** arise when a psychological need meets its object, whereas object can include human beings or animals and is not restricted to entities. Psychological Motives are dependent on the context of the interaction. A psychological need can therefore include many different psychological motives in different contexts. According to Activity Theory [Leontjew 1982] this segment includes psychological needs, motives as well as goals and subgoals.
Finally, the user's **motor skills** equate to the information transfer [Schmidtke 1993]. He performs the usage with his muscular system. This output can be manual, vocal, etc. [Wickens 2009].

3.4 The usage

This element represents the relationship between user and development object. The user can perform an **activity** according to the levels described in Activity Theory [Leontjew 1982]. The most abstract view is an activity, caused by the user's motive. As mentioned in chapter 3.3 this motive arises from the user's needs and the available development object. The activity may be realized by different actions. Activities can be unconscious, action are conscious. Operations and Sub-operations are the most concrete level of activity and show the way how actions are carried out.
Beyond the level of activity, the human **behaviour** plays an important role concerning UX. Experiences of usage may be completely different depending on the performance skill of user. A rule-based or knowledge-based usage results from a quite new interaction of user and development object. In this case, especially the learning, new impressions and first successes can cause UX. However, a skill-based usage has different impacts on the user's perception and emotions.
Finally, the ownership structure influences UX. The **possession** of a desirable product has another impact on the user's emotional reaction compared to a borrowed product. Even the state of possession without any interaction or physical reciprocity can cause a positive experience.

3.5 The development object

Four relevant factors affect the development object element. The term was chosen to include more than physical product criteria and points out the conceptual status within the development process. The element consists of the practical, formal aesthetic, symbolic and indication segment. It is based upon the Offenbach Theory of Product Language [Steffen 2000]. The segments are described in chapter 2.5.

3.6 The effect

The effect results from the interaction. The effect as expected by the user is what he wants to achieve consciously or unconsciously by using the development object. By contrast the real happening effect supplies the human perception, is further processed and evaluated by the user. The effect element serves as basis for the comparison with the user's motives. Compared to existing interaction models the effect is more emphasized and therefore illustrated as an own element. We assume that there are several effects of the interaction with different temporal aspects that evoking UX.

The **state** has no temporal aspect at all. It is just the fact of existence or possession of the development object. Already the awareness of owning or regarding a product can cause a positive emotion and UX. Also the state of regarding a product and thereby using its aesthetic function is meant by this segment. By contrast, the **process** of interaction has a certain temporal extension. Here, aspects like usability and joy of use influence the object's perception and can thereby trigger UX. The **result** is reached by the completed interaction process. It can be seen as the state after having used the product.

4. Illustration of the model

The model supports various tasks as discussed above: explanation, prescription, communication. Here we want to illustrate the explanation of experience, which enables to generate a deep understanding of experience concerning a specific topic and then to systematically expand it. By this it prescribes experiences finally. In the following we illustrate the explanation of experiences providing a brief case study. Especially we focus on identifying vital elements in experiences and reveal relations to structure experiences applying the CEIM.

In order to illustrate the application of the model we stress an example concerning eMobility. A technology push approach characterizes eMobility recently; an increasing pull of the customer side (earlier environmental movement but today increasingly lifestyle) accompanies the push of technology and nowadays more and more users detect applications in their daily life. Rising understanding of experiences can especially support designing fitting products for eMobility, because it is quite a new field for both designers and potential users.

4.1 Case study: Review of a pedelec

Pedelecs have been on the market for several years and are drawing more and more attention. In our perspective the limiting factors of eMobility (e.g. limit of range) do not affect Pedelecs directly because they only provide electrical assistance to the bicyclist, but indeed this support contributes to the total weight.

We analyse a detailed comment concerning a pedelec posted on the internet portal amazon by applying our model. At this internet portal users can provide insight on the use of a product, but also on other phases of the life cycle, such as the purchase or repair and maintenance in the form of comments. The author of the selected comment uses 1629 words to tell about his experience with the pedelec in his first 3 weeks of ownership, whereas 10 of 10 people rated the selected comment as helpful. The comment stands out by its length, depth and detail of the content. The author expresses his satisfaction concerning the pedelec in his comment (he rates it 5 out of 5 possible points), but he also reflects critically aspects concerning functions, technical features and his usage scenario.

4.2 Illustration of review extracts in CEIM

In the following we provide extracts from this comment and depict the content in our model to explain experiences. The model enables to discuss causal directions on an abstract level. Thus it separates (individual) statements and analysis of experiences. For an easier legibility we abbreviate the "development object" as "object".

Extract 1: Bike for retiree

Since three weeks I am now the owner [Usage/Possession] of an electric bicycle [Object] and dare to give a review after having driven [Usage/Activity] 500 km [Effect/Result]. The short version: the decision to buy [Usage/Activity] this really expensive electric bike [Object/Symbolic] has been one of the best decisions that I can remember [Effect/Result] supplies [User/Evaluation]. I'm in the middle

ages with fixed issues in my hip [User/Motor skills] and have a way to work [User/Motive] of 16 km within Berlin [Environment]. For me a normal bike route would be too long [Effect/Process] supplies [User/Perception leading to User/Evaluation]; I am used to drive to work [Usage/Activity] with shirt and jacket. Therefore the idea to use an e-bike. But a lot of e-bikes have a charm of retiree bikes of their own [Object/Symbolic] enables [Effect/State] supplies [User/Perception leading to Evaluation].
*Applying the CEIM to the purchase decision results in the causal depiction that supports explanation of experience. The user describes why he is confident to have bought the bike: [*User/Motor skills*] performs [*Usage/Activity*] with [*Object/Practical*] enabling [*Effect/Result*] supplying [*User/Perception leading to Evaluation*] in spite of [*Object/Symbolic*].*

Extract 2: Embarrassing side mirror

The electric motor limits its support up to a speed of 25 kilometres per hour (kph) normally [Object/Practical]. This has legal reasons [Environment]: Supporting more than 25 kph, the bike is considered a light motorcycle, which requires an insurance for about 100 € per year and a license tag, has to drive officially on the street, needs a side mirror, and a lighting system, which is powered by battery. (...) My first observation: the side mirror [Object/Practical] has potential to cause embarrassment [Effect/State] supplies [User/Perception leading to Emotion which contribute to Expectation]. After about 500 km [Effect/Result], I must confess [User/Processing]: good to have this mirror [User/Evaluation]. I would have never thought, how many times I actually looked [User/Activity] in the side mirror at fast cruising speed (about 25 kph average) to observe the side traffic [Environment]. There's a simple reason: Car drivers [Environment] have little or no previous experience with e-bikes, which are equipped with license tags [Object/Indication] and must drive on the street. And accordingly cars are horning passionately! But the drivers do not horn only short, no, I experienced in Berlin up to 10 seconds constant horning [User/Perception]. My aggression potential [User/Emotions] is beginning to rise massively.

When analysing the impact of the side mirror, it becomes clear, that legal reasons require a side mirror, but the appearance impresses the users. Despite the function and necessity of use of the mirror succeed in convincing the user finally: [Object/Practical] enables [Effect/State] supplies [User/ Perception leading to Emotion which contributes to Expectation and Evaluation].

Extract 3: Smile on the lips

On my route I have slopes that show up consistently over more than 3 km uphill [Environment]! With a normal bike, I'm here at least for the first time really sweaty [User/Motor skills] performs [Usage/Activity] leading to [Effect/Process] and slightly discouraged [User Emotions]. On the e-bike I ride up the slope easily [Usage/Activity] causes [Effect/Process] supplies [User/Perception] by 25 kph [Usage/Activity] causes [Effect/State] and have a smile on my lips [User/Emotion]! Permanent headwind [Environment]? With the E-bike it's no problem [Usage/Activity] with [Object/Practical] enables [Effect/State] supplies [User/Perception, Evaluation and Emotion]!

Here the user compares driving a normal bike on his route to work: [Effect/Process] in [Environment] supplies [User/Perception] causing [User/Emotions] to his ride on the pedelec [Usage/Activity] causes [Effect/Process] and [Effect/State] supplies [User/Perception, Evaluation and Emotion].

4.3 Discussion

Using the example of a pedelec we showed the application of our model to explain und understand experiences. Therefore we analysed qualitatively described experiences and structured the elements utilizing the model. It is very important to focus specific issues and draw a system boundary in order to purposively apply the CEIM. The model then represents experience on an abstract level, which allows for revealing relations and causal directions to gain a deeper understanding. The very detailed comment on the pedelec provided several experiences, which we analysed above (bike for retiree, embarrassing side mirror, smile on the lips). Applying the CEIM reveals several starting points to become aware of and tackle a design problem (e.g. the impact of the side mirror). We showed that we can structure the statements concerning experiences using our model. This representation supports deduction of relations between fragments of the statements (e.g. Extract 1: purchase decision:

[Usage/Activity] with [Object/Symbolic and Practical] enables [Effect/Result] supplying [User/Perception]). The model then supports to deeper understand the experiences allowing to question the experience purposively (e.g.: What product characteristic contributes how in the user's perception?).

5. Conclusion and outlook

CEIM supports the interpretation of qualitative statements for prescribing experiences. It aligns explicit statements to induce implicit elements of experiences. The model is a means to deal with reported experiences and depicts relations and causal directions based on qualitative data. This enables a discussion of experiences on an abstract level. Thus a deeper understanding of experiences results and provides a base towards purposively prescribing experiences.

More research has to be done concerning further validation of the model in practice and real processes. Therefore, CEIM is planned to be applied in industrial projects concerning UX. We see a high capability of the model for the process of designing and evaluating experiences. Based on the different elements and segments generic questions could support a designer to think of diverse possibilities to develop UX in terms of a checklist. We assume that there are recurrent patterns of experiences that are potentially repeatable. These significant causal connections could easily be illustrated in CEIM. Furthermore, it could support the generation of stories to communicate an experience based design approach.

Beyond that, the integration of service aspects enriching the product's functionality to product service systems (PSS) are still missing in the illustration of CEIM. We expect that the importance of PSS for the user's experience will increase drastically and thereby will offer new opportunities for unique selling propositions. CEIM needs an extension concerning these service aspects.

Finally, more research needs to be done on the environment element, as it is seen as a highly important influence for designing UX in most approaches and at the same time seldom described on a concrete level. Regarding a specific application of CEIM, the most important parts of the environment and their influences on the interaction and elements should be known. A systematic approach to gather and structure these influences would help a lot to design for UX.

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