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All in all, he see himself as an open-minded strategist, always looking for user problems in everyday life. Breaking them down into its parts and turn those not only into solutions but opportunities for a transformation in value creation.

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User Experience Design Principles for all

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Abstract

User Experience Design can be described as a person's perception and responses that result from the use and/or anticipated use of a system, product, or service. As the short definition shows it is not only limited to the profession of IT. As Don Norman says, it is part of our everyday things and actions. Or as Hassenzahl (2010, Position 256) defines: „An experience is a story, emerging from the dialogue of a person with her or his world through action. User Experience is not much different from experience per se. It simply focuses our interest on interactive products […] as creators, facilitators, and mediators of experience."

Overall, user experience deals with five critical elements. (1) The person actively using the product or service is the user. (2) A system, whether viewed comparatively narrowly as a product, software, a user interface of an app, or more broadly as a service, organization, or brand. The themes, concepts, and principles of user experience apply to products and services of all kinds. (3) The use or the interaction of the user with the system. (4) The user's perceptions result from using the product or service. These are mainly psychological phenomena, like the joy of using it or physical discomfort resulting from using the system. (5) The person's responses/feedback resulting from the use of the system. Internal emotional responses are relatively hard to detect, but many responses are behavioral and can be clearly seen in the person's actions.

A term often used in combination with User Experience Design is human-centered design. It describes the ongoing process of discovering and embracing the user's perspective. It observes what is necessary to make the product usable for them. Furthermore, it deals with conceptualizing and designing for those needs while also considering the company's design goals as well as the organization's requirements for success.

But, how to design for a great experience? The article covers three possibilities. (1) Gamification. It is a term with numerous different definitions and growing practice in environments like engaging elderly citizens with routine tasks and spare-time activities or applying gamification principles to educational programs. One highly cited definition is: "Gamification is the use of game design elements in non-game contexts (Deterding et al., 2011, p. 10)." (2) Playful experiences. Experiences must: "dazzle [customers] senses, touch their hearts and stimulate their minds" (Schmitt, 1999, p. 22). Thus, customers take a qualitative, functional, and personally satisfying experience for granted. Customers always look for challenging experiences. Therefore, designers need to design an experience concept that engages users instead of designing just a service model. (3) Action and routine experiences. Following the approach from Donald A. Norman (2013). He came up with seven stages of action and three different levels of processing that describe human action and guide the development of new experiences.

Definition of User Experience Design

Let's imagine it is Monday morning you wake up to sunlight streaming in your window and wonder why your alarm clock hasn't gone off yet. You check the status of your watch and see that it thinks it is 3:24 a.m. Still, lots of time till to commute to

work. What is wrong with the daylight out there? You stumble out of bed to find another clock, which tells you that it is 8:13 a.m. If you leave in ten minutes, you can still make it to work on time.

No start into the day without at least one cup of coffee. You turn on the coffee maker before entering the bathroom. But, after getting dressed, you go to retrieve your dose of caffeine, the coffee mug is empty. Unfortunately, there is no time to figure out what is wrong with the machine since you must get to work.

Ready to take off with your car, a loud "beep" brings you back to reality. You need a gas station. Otherwise, you will not make it to work. At the station, you use the pump you are constantly using. The one which accepts credit cards. This time it won't accept yours, and you need to see the cashier inside the station.

After waiting in line to pay for your gas, you need take a detour because of a traffic accident on your route. Disastrously the drive takes longer as expected. Despite all your efforts, you arrive late on your desk. Additionally, you are agitated, harried, weary, and irritable. Remember, your day hasn't started yet, and you are still waiting for your first coffee.

Introducing User Experience

What a start to the new week. Was it only a string of bad luck? Let's rewind the series of events.

The accident on your route happened because the driver of the withe SUV took his eyes down to the radio to adjust the volume. He had to look down because it was impossible to identify where the volume control was located.

The line you had to wait to pay for your gas moved so slowly because the program at the cash register was so slow, complex,

and confusing. If the software had been more straightforward and the user interface easier to understand, the line never would have formed.

The credit card debacle occurred because you had turned the card around and swiped it on the wrong side. Nothing on the pump indicated which way the card should be turned.

The coffeemaker didn't work because you missed to turn it completely on. It doesn't do anything to let you know that it has been turned on. No visual or audio feedback at all.

The alarm clock slowed down because the battery was almost empty. Unfortunately again no visual or verbal feedback that this will happen soon. A simple battery icon would have prevented the clock to slow down, and consequently you would have been out of bed with plenty of time.

As a summary, all the previous cases could have been avoided had someone made more iterations and different choices in designing the products and services. All examples demonstrate a lack of attention in the field of User Experience Design (Garrett, 2011). "When a product is being developed, people pay a great deal of attention to what it does. User Experience is the other, often overlooked, side of the equation - how it works - that can often make the difference between a successful product and a failure. User Experience is not about the inner workings of a product or service. User Experience is about how it works on the outside, where a person comes into contact with it. When someone asks you what it's like to use a product or service, they're asking about the user experience. Is it hard to do simple things? Is it easy to figure out? How does it feel to interact with the product?" (Garrett, 2011, p. 6).

Example – Buying a ticket at a ticket machine:

First of all, you might have to wait in line while buying your ticket. This might not be necessary if the provider offers an app or an online version to buy your ticket. Secondly, after it is your turn you have to figure out which ticket is really necessary for your plan to e.g.: commute to the airport. Is it easy? Or does it take plenty of time and as a consequence you are missing the next train? After selecting the correct ticket you normally have to pay. Which options does the provider offer to pay for the transportation? Which credit cards are accepted? Where is the location to insert your card or cash? Finally, how do I get my ticket? Is it already valid or is it necessary to devaluate the ticket?

As you can see User Experience Principles and Methods are in almost everything you or interacting with. The whole process of buying a new ticket can be seen as a User Experience Project. It can also be seen as a whole Service Design Project with different User Experience parts. Like, how is the User Experience of selecting the correct ticket? How is the User Experience of paying for the ticket? To mention only two of the whole process.

Don Norman and Jakob Nielsen (n.d.) define User experience as follow: "[It] encompasses all aspects of the end-user´s interaction with the company, its services, and its products."

In addition, DIN EN ISO 9241-210:2019 (DIN, 2019) defines it: "[A person's] perception and responses that result from the use and/or anticipated use of a system, product or service."

At the most basic level is user experience a set of subjective psychological events and states (perceptions) experienced by an individual user/human. After using the product or service the

individual user might give feedback on his experience (responses). (Voil, 2020).

Moreover, user experience design takes not the only place in the profession of IT or software. Nowadays it is anchored everywhere. Allegra W. Smith (2019) discusses the profession of user experience design for adults aged 60+. Or, Iis P. Tussyadiah (2014) observes a theoretical foundation of user experience in the tourism industry. She suggests three fundamentals in tourism experience design: (1) Human-centeredness; (2) Iterative designing process; (3) Holistic experience concept as an outcome of designing.

Furthermore, her approach to experience design does not differ from the approach e.g.: solving an application interface problem: (1) naturalistic inquiries and empathic design to target experience narratives; (2) participatory design involving tourists at every stage of designing; (3) integrative design research that includes explorative, generative, and evaluative research as essential parts of designing; (4) the orientation of concepts and theories from multiple disciplines as applied to tourism contexts.

As the last example, Gianluca Brugnoli (2009) connects the dots of user experience in the area of information architecture. He says: "The user experience takes shape on many interconnected devices and through various interfaces and networks used in many different contexts and situations. To achieve their goals through the interaction flows, users tend to combine an increasing number of different applications and tools within wide and fuzzy ecosystems, where technical factors blend in with behavior and intention. The user experience itself is the result of a non-linear and occasional combination of various systems' fragments and components, which are activated and connected by users from

case to case, following their goals and intentions in specific times, situations and contexts (p. 7)." This scenario promotes new challenges and opportunities. In addition, it limits the profession of User Experience Design. Can we simply adapt all the key concepts, tenets, and tools of user experience design and analysis from one profession to the other? Or might we revise some of them? Brugnoli´s (2009) answer on that question is clear: The first shift concerns the role of the user: they are always in the center but in a different way. In the system approach, the user is the active protagonist of the experience flow, who selects and connects the dots of the interaction system making the experience alive. Nevertheless, for designers and analysts, user behavior is not always a predictable and logical a priori. On the other hand, the user action affects device's scope and features: applications and processes should be flexible enough to change roles and adapt to different action flows. Primary and secondary features switch continuously following user interaction, even without a predefined or optimal action plan (p. 7-8)."

Definition of User Experience according to Marc Hassenzahl

"An experience is a story, emerging from the dialogue of a person with her or his world through action. User Experience is not much different from experience per se. It simply focuses our interest on interactive products [...] as creators, facilitators and mediators of experience" (Hassenzahl, 2010, Position 256).

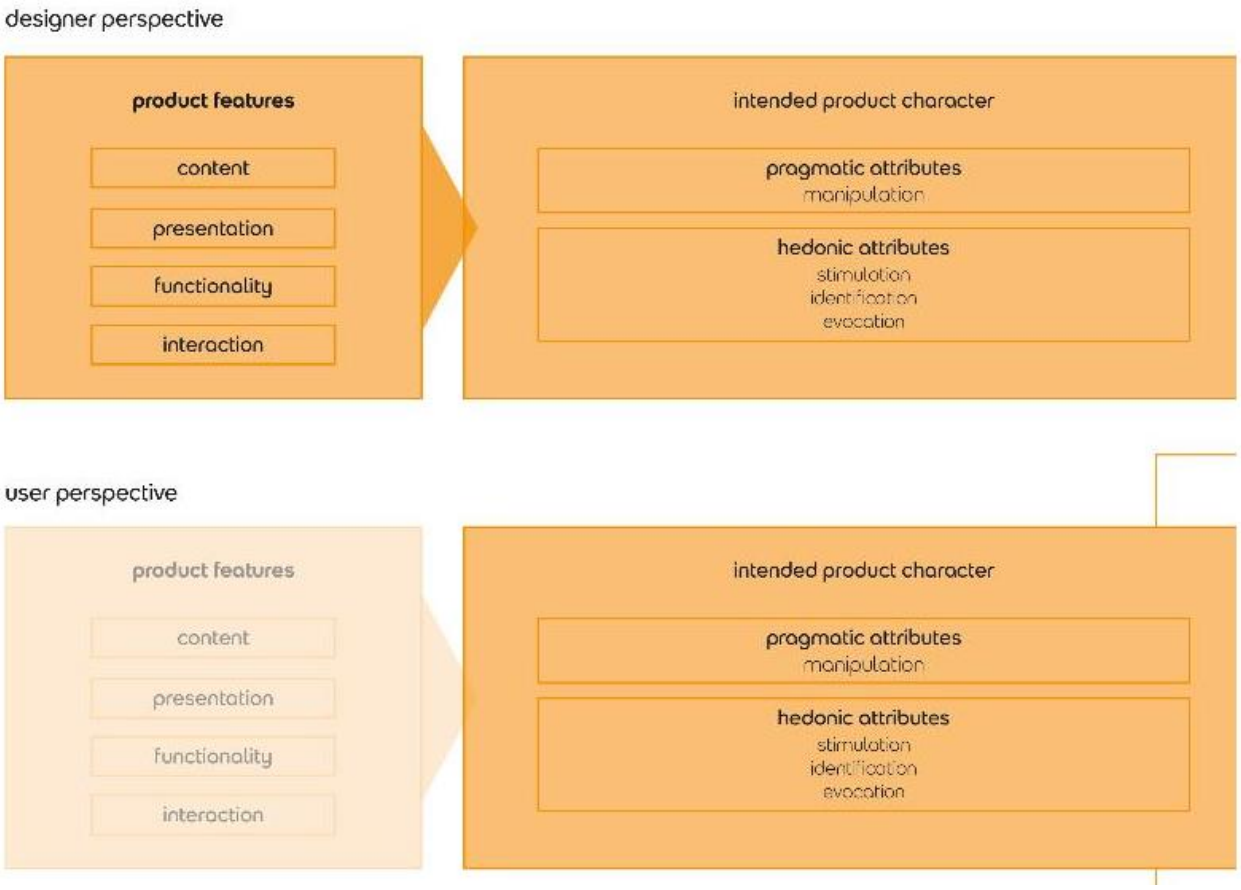

Figure 1: Key elements of the model of user experience from a designers perspective, and a user´s perspective Own figure based on Hassenzahl (2003, p.32)

As can be seen in the figure, a product has the following features: Content, Presentation, Functionality, Interaction. Taken up by a designer these are combined, in order to transport thereby a certain and planned product character (Janlert & Stolterman, 1997). This is regarded thereby as a high-level description of the product and is at each time subjective and intended by the designer. Character traits can appear useful, predictable, or interesting in this context. The function of the product character is to reduce cognitive complexity and to ensure for the user simple handling of the product (Hassenzahl, 2003). Furthermore, the character accurately describes the artifact, making it easy for the user to value the interaction with the product (Janlert &

Stolterman, 1997). The contact between user and product triggers an individual process. Initially, the product features are perceived, from which the user constructs his own personal character. This is evaluated hedonically and pragmatically, as well as influenced by known product interactions. This apparent character leads to consequences, which are either reflected in an evaluation of the product (e.g.: good/bad) or causes emotional consequences (joy/fear). This always depends on the use of the product and the given situation (Hassenzahl, 2003).

"There is no guarantee that users will actually perceive and appreciate the product the way designers wanted it to be perceived and appreciated" (Hassenzahl, 2003, p. 33).

Critical elements of User Experience Design

The definitions above, as well as the example, illustrate that we can see five key elements:

1. ***The person actively using the product or service is the user.***

2. A system, whether viewed comparatively narrowly as a product, software, a user interface of an app, or more broadly as a service, organization, or brand. The themes, concepts, and principles of user experience apply to products and services of all kinds.

3. The use or the interaction of the user with the system.

4. The user's perceptions resulting from using the product or service. These are mainly psychological phenomena, like joy of using it or physical discomfort resulting from using the system.

5. The person's responses/feedback resulting from the use of the system. Internal emotional responses are relatively hard to detect,

but many responses are behavioral and can be clearly seen in the person's actions. (Voil, 2020

2.0 Principles of Human-centered Design and Interaction Design

A term often used in combination with User Experience Design is human-centered-design. It describes the ongoing process of discovering and embracing the user's perspective. It observes what is necessary to make the product usable for them. Furthermore, it deals with conceptualizing and designing for those needs while also considering the company's design goals as well as the organization's requirements for success (Still & Crane, 2017).

2.1 Human-centered design and Experience Design

Human-centered design

People are frustrated with everyday things. From the ever-increasing complexity of the smartphone to the increasing automation in the home with its internal networks, complex music, video, and game systems for entertainment and communication. Everyday life sometimes seems like a never-ending fight against confusion, continued errors, frustrations, and a continual cycle of updating and maintaining our belongings.

Design has gotten better in the past decades. New technologies, new applications, and new methods of interaction are continually arising and evolving. Each new development seems to repeat the mistakes of the earlier ones. Each new invention of technology or interaction technique requires experimentation and study before the principles of good design can be fully integrated into practice.

So, yes, things are getting better, but as a result, the challenges are ever-present (Norman, 2013).

"The solution is human-centered design (HCD), an approach that puts human needs, capabilities, and behavior first, then designs to accommodate those needs, capabilities, and ways of behaving. Good design starts with an understanding of psychology and technology. Good design requires good communication, especially from machine to person, indicating what actions are possible, what is happening, and what is about to happen. Communication is especially important when things go wrong. It is relatively easy to design things that work smoothly and harmoniously if things go right. But as soon as there is a problem or a misunderstanding, the problems arise. This is where good design is essential to design. Designers need to focus their attention on the cases where things go wrong, not just on when things work as planned. This is where the most satisfaction can arise: when something goes wrong but the machine highlights the problems, then the person understands the issue, takes the proper actions, and the problem is solved. When this happens smoothly, the collaboration of person and device feels wonderful (Norman, 2013, p 9)."

Human-Centered Design is not about following processes. It is about being mindful of HCD principles. Keep the focus on people and the entire system to solve the right problems (Norman, 2013).

HCD: "… it can help your organization connect better with the people you serve. It can transform data into actionable ideas. It can help you to see new opportunities. It can help you to increase the speed and effectiveness of creating new solutions" (IDEO, 2015, p. 4). The process is called "human-centered" because the first step of the process is always to examine human needs, wishes, and behaviors. The aim is to understand what people

desire. Thus, "desirability – what do people desire?" is the first step. The second and third step is to view people desires through the lenses of "feasibility – what is technically and organizationally feasible?", and "viability – what can be financially viable?" The emerging solution at the end of the process should hit the overlap of these three lenses. Hence, the solution needs to be desirable, feasible, and viable. The process itself consists of three main parts. First, the "hear" phase. Researchers collect stories and inspirations from people while using techniques like observations or qualitative interviews. Second, the "create" phase in which the evaluation and transformation of research insides into frameworks, opportunities, solutions, and prototypes take part. Third, the "delivering" phase includes everything that is necessary to launch the new solution. Prototypes are getting more accurate, user testing, and iterations take part in this phase. Finally, rapid revenue and cost modeling enable the product launch (IDEO, 2015).

3.0 Designing for experiences

The following chapter examines possibilities to design for user experiences. The subchapters are (1) gamification, (2) playful experiences, and (3) action and routine experiences.

Gamification

Is a term with numerous different definitions (Deterding et al., 2011) and growing practice in environments like engaging elderly citizens with routine tasks and spare time activities (Gerling & Masuch, 2011) or applying gamification principles to educational programs (Dicheva et al., 2015). One highly cited definition is: "Gamification is the use of game design elements in non-game contexts" (Deterding et al., 2011, p. 10). To increase user

motivation, activity, and customer retention (Deterding et al., 2011). Therefore, game elements in non-game contexts should be simple, motivate, engage, and make fun (Zichermann & Cunningham, 2011). To implement gamification in other design practices (e.g. service design), designers have to follow certain principles. First of all, they have to challenge their users. Therefore, the service needs to have a goal whose result is uncertain. Also, users need the presence of performance feedback that indicates how well they are doing and how far they are from completion (Malone, 1980). Don Norman (2013, p. 52) used to say: "A lack of feedback creates a feeling of lack of control, which can be unsettling." Furthermore, clear goals should be provided by simple games and structured by complex environments (Malone, 1980). Such sub-goals are a path of fixation points, as well as concrete and simple to manage which inspires action (Rahman et al., 2008). Additionally, the uncertain outcome of the goals needs to facilitate different levels of difficulty, and multiple level targets. Thus, services should challenge users through competitions. It motivates to continue using the service (Malone, 1980) and as soon as a game is not completely automatic and invites the user to participate it becomes less predictable and more realistic (Jonsson & Waern, 2008). Further, goals are compelling because they engage a person´s self-esteem. The feeling of success in the service also increases the well-being of the person using the service. Secondly, fantasy should be included into other design practices. Therefore, the system has to evoke mental models or physical objects which are currently not present at the service. Fantasy should always be combined with emotions and metaphors. Hence, the service needs to address and satisfy specific needs of the user to derive appealing emotions (Malone, 1980). Addressing certain user needs within service experiences is crucial because the value of a service depends on how it satisfies needs in

particular situations. If services approach the desired needs accurately, services are appealing and cause emotional reactions. Though, two different emotional reactions need to be distinguished. First, satisfaction is often related to the fulfillment of expectations. Secondly, pleasure is mostly related to unexpected events within the service experience (Hassenzahl, 2005). Additionally, using metaphors which are already known to the user can support him by difficult tasks like learning a complex system. Curiosity, the motivation to learn is the third principle to add. Therefore, services should always support novelty and surprise but never complexity. Thus, the system must provide surprising, random, and constructive informative feedback (Malone, 1980). Nevertheless, the basic service system should always be self-evident, obvious and self-explanatory (Krug, 2006). Alternatively, as Steve Krug (2006) used to say: "Don´t make me think" (p. 11). The optimal environment let the user know what to expect next but only meets these expectations randomly. Also, the informative feedback can be presented through sounds, visual graphics, rewards or through cognitive curiosity that gives the user the feeling of lack of knowledge by presenting just enough information that the user feels inconsistent (Malone, 1980). A further pervasive game design principle is that the design of tangible experiences is central. Therefore, the service must provide an unforgettable feeling for the user which can be achieved through narratives and related rewards. Storytelling, another principle provides a frame for experiences to motivate users (Montola, Stenros & Waern, 2009). People are always up to look for cause and effect relations of a certain event. Therefore the storytelling principle is so powerful because they are used to form explanations and stories (Norman, 2013). Thus, the narrative develops curiosity and offers rewards for discoveries. Further, the storytelling approach immerses the user in the experience and

transfers him into the state of flow (Montola, Stenros & Waern, 2009). The concept of flow describes a mental state of a person who is fully immersed and focused on performing a certain activity (Csikszentmihalyi, 1990).

Playful experiences

Services must: ”dazzle [customers] senses, touch their hearts and stimulate their minds” (Schmitt, 1999, p. 22). Thus, customers take a qualitative, functional, and personally satisfying service experience for granted (Hassenzahl, 2005). Customers always look for challenging experiences. Therefore, designers need to design an experience concept that engages users instead of designing just a service model (Overbeeke et al., 2005). Designers must have specific knowledge about their customers and have to understand how they do and feel during their experience (Overbeeke et al., 2002). Nevertheless, while designing experiences, it is always important to remember: "... that we cannot design an experience. But with a sensitive and skilled way of understanding our users, we can design for experience" (Wright, McCarthy & Meekison, 2005, p. 52). Service users often use services that result in the enjoyment of the experience. Thus, services should be challenging, seductive, playful, surprising, and memorable. Thereby, experiences shift from a good-looking first appearance to delightful interaction and further engagement (Overbeeke et al., 2005). To design such engaging experiences, Djajadiningrat, Overbeeke, and Wensveen (2000) came up with ten rules to augment fun and beauty in interaction design. Out of this regulations, relevant for designing service experiences are: (1) Don´t think service, think experience. Thus, service designers must offer an engaging environment in which the service concept takes place. Additionally, the user should have the possibility to influence the environment and therefore the experience. (2) Don´t

think beauty in appearance, think beauty in interaction. Services should convey a feeling of appealing at first glance, but they should also engage through an ease-of-use framework. (3) Don´t think ease of use, think enjoyment of the experience. To achieve the second rule, consider designing for experiences to HCD approaches. Design challenging, seductive, and playful experiences. (4) Don´t think labels, think expressiveness and identity. Always provide multi-sensory feedback while designing for the service experience. The service user should always have a feeling of control and should know the current status of the system. (5) Don´t hide, don´t represent. Show. Never expect a service system component as self-evident. Display as much information as necessary to provide a smooth and logical experience. (6) Don´t think affordances, think irresistible. Design a service system that is compelling, desired and fulfills user needs. (7) Hit me, touch me, and I know how you feel. Applicate the HCD principles for an engaging service. Thus, as soon as a designer understands user needs, (s)he is capable of building up a comfortable environment and service context to satisfy those needs (Djajadiningrat, Overbeeke & Wensveen, 2000). Marc Hassenzahl and colleagues suggest another approach to design for experiences. They advocate separating a specific experience into three different stages, the patterns. First, the anticipation phase, which could be the trigger in case of this paper. Secondly, the event, the activity and routine phase, and third the cooling-off, the reward phase. All in all, the patterns aim to satisfy a certain need of the service user that is linked to a particular service context. Furthermore, sharing an experience intensifies the feeling of satisfaction, and it becomes more meaningful to the service user. Essential for shared experiences is that all participants share the same understanding and consumption of the event. Therefore, for designing a new service experience, a designer must implement a

service concept within the three distinct stages and use this framework to tell a new story. Nevertheless, applying the pattern to a specific service context is often constrained by the situation. Additionally, designers have to consider shaping experiences through the available material. Regarding a service concept, a material is everything (a diverse range of used technology, chatbots or intelligent systems are examples) which enables and assembles the service experience. Thus, the material represents the intended, intangible experience told through the shaped story plus the tangible configuration of technology. To conclude, the experience-patterns should come first and the consideration of the material secondly (Hassenzahl et al., 2013).

Action and routine experiences

Donald A. Norman (2013) came up with seven stages of action and three different levels of processing that describe the human action and guides the development of new products or services. First, every action consists of two parts that can affect the emotional state of humans. Second, the user has to execute the action and secondly evaluate the results. Therefore, the execution phase consists of (1) a requested goal; (2) planning the desired action to reach the goal; (3) specifying the performance of the action; and (4) performing the stated action. Additionally, the evaluation phase comprises (1) perceiving feedback of the world after performing the action; (2) interpretation of the feedback; and (3) comparing the actual output with the desired goal (Norman, 2013). Further, the three different levels of processing include (1) the reflective level; (2) the behavioral level; and (3) the visceral level, and all these levels shape the user experience. The latter one is the basic level of processing and is responsible for judging humans' environment very fast. Interpreting a service as convenient or attractive comes directly from the visceral level. By

designing for the visceral level, the service needs to have a good appearance comprises the look, feel, and sound. Thus, the design for the visceral level has nothing to do with the usability of the service. The usability is the profession of the behavioral processing level. Therefore, at this stage, appearance does not matter, but performance and usability do matter. Thus, the service needs to combine the function, understandability, usability, and natural feeling to satisfy users expectations and requirements. Thereby, good behavioral design needs to be human-centered and should support the learning curve of the desired action because behavioral states are learned states. The top processing level, reflective level deals with conscious actions of the user while the visceral and behavioral levels occur unconsciously. Thus, the experience on the reflective level depends always on the mind of the beholder, and it cannot be designed. It is more a long-term development between the customer and the service through excellent service experiences (Norman, 2004). All in all, Norman (2013) differentiates between feedback and feedforward for designing excellent service systems. The former describes information to understand what happens and the latter one provides answers to execute the action correctly. Furthermore, about the seven different stages of design, he came up with seven fundamental principles of design. First, discoverability determines the possible actions at current states of the service. Secondly, feedback is always important to convey the current condition of the service to the user. Third, conceptual models are required to design for all three different processing models and for applying the HCD approach. Fourth, affordances are necessary that the user can perform well. Thus, the service must always be straightforward and easy to use. Fifth, signifiers need to appear correctly and at the right time. Therefore, feedback and feedforward are well communicated. Sixth, mapping describes the

relationship between the action and their controls. Through proper mapping, service users always know what happens after performing an action. Finally, constraints refer to respect different cultures and use existing knowledge from the world and from the people to design services that are easy to interact with (Norman, 2013), and always consider: "Technology changes rapidly, people and culture changes slowly." (Norman, 2013, p. 282).

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