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HOW SHOULD DESIGNERS FORMULATE USERS' INSIGHT? - COMPARISON BETWEEN NOVICES AND PROFESSIONALS

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ABSTRACT
This research investigated the difference between novice and professional designers in terms of skills of gaining insights into design process. This study experimentally examined the designers' behaviours in gaining insight by comparing how novice and professional designers empathise differently toward users. In the experiment, designers were asked to create a concept map and gain insights from a prepared user-interview transcript. The participants were interviewed about how they gained insights of users from the transcript. The concept map and insight statements were analysed. As a result, we clarified a difference between novice and professional designers which were generalisation of the transcript and inclusion of suppositions into insight statements. This study is a first step to analyse and support the insight generation of novice designers.

Keywords: Empathy, gaining insight in design

1 INTRODUCTION

To be successful in today's market, companies aim at developing innovative ideas of new products or services, which respond to the underlying user-needs [1]. To develop innovative solutions, it is crucial to find a clear and right problem to be solved by designs, which can be achieved by discovering insights from the target users [2,3]. Insight in design is defined as a *"clear, deep, meaningful perception into a particular design contexts"* [4]. Gaining insight is one of the most important challenges in design process [2]. It is critical to get deep empathy with the users to gain meaningful insights [1]. Empathy has been researched in the area of psychology, which influences research of empathy in design. Batson (2009) described that empathy is supposed to answer two questions: "how one can know what another person is thinking and feeling" and "what leads one person to respond with sensitivity and care to the suffering of another" [5]. Thereby, empathy in design is expected to play roles in perceiving user's feelings and emotions to gain insight into users' needs. Kouprie (2009) model empathy in design as a process that comprises four phases, discovery, immersion, connection, and detachment [6]. Through the process of empathy, designers need not only to step into users' world but also to observe the users' world to contrast the users' experiences with designers' own experience and knowledge. Hess (2016) divide empathy in design into four distinct empathy types by two dimensions: affective experience versus cognitive process and self-oriented versus other-oriented empathy (Table 1) [7]. The four distinct empathy types show that empathy requires cognitive and affective processes with users. In affective mode, designers pay attention to users' emotional states either by experiencing the same internal state or by feeling for users. In the cognitive process, designers understand users' situation by imagining how designers would do in the potions of users or imagining how others think in the context.

Table 1. Taxonomy of empathy in design by two dimensions [7]

	Affective Experiences	Cognitive Processes
Self-oriented	**Emotional Congruence** Experience the same internal state as another	**Projection** Imagining how one would think and feel in the position of another
Other-oriented	**Empathic Concern** Feeling connected or happy for another	**Perspective-taking** Imagining how another thinks or feels

Smeenk (2019) proposes *the empathic formation compass* by combining the empathy map [7], the landscape of human-centred design[8], and *the mixed perspectives frameworks* [9,10] on the same map to express the relations among the maps from different researches in one image [9]. The proposed map can be used as a method to track the use of empathy in design process. The theoretical frameworks of empathy in design offer foundations of understanding empathy in design, while the literature has not revealed how designers gain insights through empathy.
This research aims at revealing the following two questions: "what is the difference between novice and professional designers in gaining insights from users' context?" and "what are the factors which make the differences?"

2 METHOD

Online experiments were conducted to compare novice and professional designers in how participants empathise with users and gain insights. The experiment participants were graduate students (n=11) in engineering who were learning design thinking for more than six months and professional designers (n=5) who had more than three years of working experience in design consultancy farms. In the experiment, participants were told that their task was "design a new product or service for a pleasant morning". The participants worked individually in the experiment, which was recorded by the online video meeting application. The experiment consisted of four steps (Figure 1).

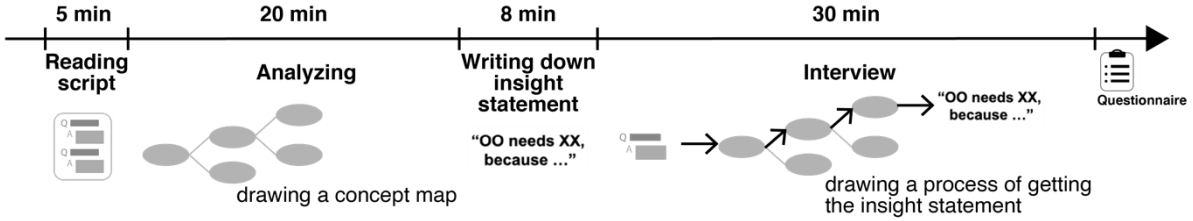

Figure 1. The process of the experiment

After a short briefing of the experiment procedure, participants were asked to read a prepared user-interview transcript which was a pre-prepared transcript of an interview conducted by an author with an interviewee. The participants were asked to think as if the same team member did the interview. The interview was related to the theme, especially focused on the wake-up time. The transcript contained sixteen questions and the responses (Q&Rs), the user's daily life in the morning, and the user's profile information, such as age and gender (Figure 2).

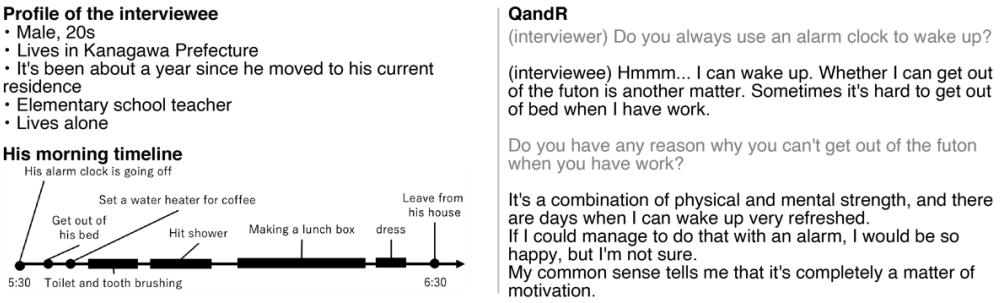

Figure 2. An excerpt of the given interview transcript

Then, the participants were asked to organise and analyse the transcript to find out the problem of the interviewee. The participants created a concept map to visualise what they were thinking and how they expanded their thoughts. Concept map is a technique that helps to generate, organise, and visualise the ideas, which was used in a software of supporting to gain insights in design [2]. In the third step, the participants were to write down at least one insight in eight minutes, based on their analysis of the transcript. A template of insight was given to the participants, which was *"'OO' needs 'XX', because '...'"*, because good insights should have comprised, the user, their needs, and the reason why they needed it [2]. *'OO'* was the subject of the phrase, *'XX'* was what *'OO'* needs, and the reason was written in *'...'*. The participants were asked to select the best four insights and to rank the selected insights. Then, the participants were asked to explain how they came up with the insight statement which had been defined

at the previous step. This part aimed to clarify the participants' perspective and the logic toward the insight statement. In the interview, we asked seven questions to clarify how the participants gained the insight. The questions were (1) which parts of the transcript did they focus on, (2) which parts of the concept map were connected to the transcript, (3) which parts of the concept map were connected to insight statements, (4) why did they focus on that part of the transcript, (5) did they imagine what the user might have thought or felt or did they project themselves in the situation of the user which referred to the definitions of "perspective-taking" and "projection" [5], (6) were there any information missing in the interview transcript which they wanted to know, and (7) were there anything they felt like a problem but could not verbalise as a user statements in the given format. After the experiment, a questionnaire was given to the participants.

As a preliminary analysis, we analysed the experiments with three criteria. First, we looked at which part of the interview transcript the participants had used to generate insight. The given interview transcript had sixteen Q&Rs which were numbered from #1 to #16, and the figure of user's daily life, which were numbered as #17. We counted how often each segment was used based on the elaborated concept map. The numbers were normalised by dividing the count by the total number of insights generated by the same participants' profile, i.e., novices or professionals because the number of participants and the number of insight statements were not equal between professionals and novices. The insight statements were evaluated by dividing segments of the insight format, which was *""OO' needs 'XX', because '…'"*. The *'OO'* part, 'subject part', were coded into three categories: the user, a person who has a 'character' of the user, such as "teacher" and "a man who often oversleeps", and object or stuff, such as new products and morning routine. The number of each of the three categories written in the insight statements were counted and then normalised the count by dividing it by the sum of the number of insight statements generated by each participant's profile. We called *'XX'* part as, 'object part,' and *'…'* part as 'reason part'. We coded both parts by the criteria of whether the participants' supposition(s) was included. If exactly the same words or phrases as both of the parts were stated in the user-interview script, the part was coded as 'directly from the interview'. Otherwise, we coded it as 'supposition included'. As each part was coded into two categories, an insight statement fitted into one of four groups as Table 2. After coding all the insight statements into four groups, we examined the difference between novice and professional designers with the number of insight statements coded as each group divided by the sum of the number of insight statements. The values were calculated separately for novice and professional designers.

Table 2. Taxonomy of the insight statements in this experiment

		'…' reason part	
		Directly mentioned in the interview transcript	Including participant's supposition
'XX' object part	Directly mentioned	DxD	DxS
	Supposition included	SxD	SxS

3 RESULT

Figure 3 is an example of the final outcomes of the experiment. Area of the concept map and insight statement were generated during the analysis and stating insight statement phase. The arrows and notes were added based on the interview. This study reports the result of the count of the interview transcript used for the insight statements and analysis of the insight statements.

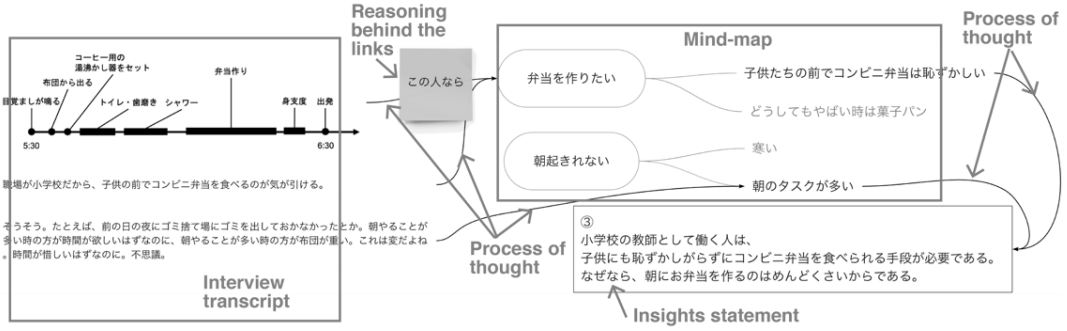

Figure 3. An example of concept map and process of gaining insight

The generated insight by novice participants was, for example, “People who wake up early need to have an open mind, because rushing to get ready can cause a lot of stress.”. The example of insight by professional designers was “the user needs support to finish daily tasks efficiently (To gain a control over life) because it would save the user more time”.

3.1 Result of use of the interview transcript

Figure 4 shows the comparison of the ratio of novice and professional designers for each Q&Rs in the interview transcript (#1~#16) and the figure of user's daily life as # 17. The results were statistically analysed by proportion test. There were no significant differences in the comparison, where the smallest p values ($0.17 > 0.05$) were founded in $i = 12, 14$. This result suggests no difference in which parts of the interview transcript were used between by novices and by professionals.

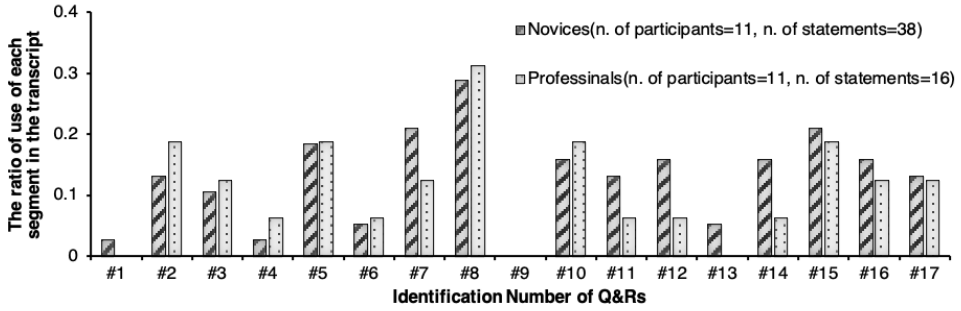

Figure 4. Q&Rs connected to user-needs per number of user-needs

3.2 Result of Subject part of needs

The novice participants generated 38 insight statements, while professional designers wrote down 16 sentences. The subject of each insight statement was coded into three categories. The number of insight statements coded as each category was divided by the sum of the number of insight statements. Figure 5 shows that the result of the ratio of the subject of insight statements. For each category, significant differences were found by proportion test ($p < 0.01$). Novice designers were more likely to write generalised characters which are the same 'character' with the interviewees of the transcript as a subject of insight statements. By contrast, the professional designers wrote more "the user" or "not the user nor character" than the novices. "Teacher" was the only character that professional designers wrote in the insight statements, and that was the most frequently stated character (12%) of all participants as well.

Table 3. Examples of each category and proportion of the characters used in the subject part

Character categories	Examples of each category: *'OO'*	The number novice/professional (percentage in all codes)
teacher	Teacher	5/4 (12%)
cannot wake up / oversleep	A person who often oversleeps	7/0 (17%)
cannot get out from the bed	A person who cannot get out of bed	5/0 (12%)
many tasks to do	A person who has many tasks in the morning	4/0 (10%)
drink coffee	A person who drinks coffee in the morning	2/0 (5%)
low self-control	A person with poor self-control	1/0 (2%)
wake up early in the morning	A person who must wake up early	2/0 (5%)
work efficiency	A person who values efficiency	1/0 (2%)
have something to do	A person who has things to do in the morning	1/0 (2%)
consider	A person who thinks what to do in his head	1/0 (2%)
lives alone	A man who lives alone	5/0 (12%)
go to work in the morning	A person who goes to work in the morning	2/0 (5%)
have morning routine	A person who has a morning routine	1/0 (2%)

Forty-one user-needs were categorised as 'character,' and thirteen different types of characters were mentioned (Table 3). In table 3, the numbers of each categories were counted within insights statement of the same participants' profile. The ratio of each character to all insight statement categorised as 'character'. The characters were based either on participants' profile or on the transcript of the interview. The result implies that in writing down sentences, the novice participants tended to generalise while professionals stick to the interviewee.

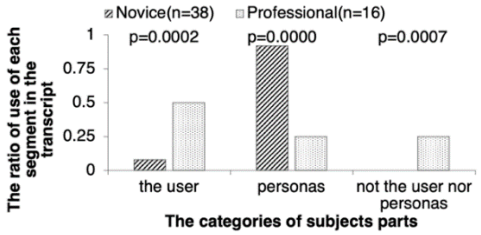

Figure 5. Comparison of subject part

3.3 Results of the user-needs construction

The object part and reason part of each insight statement were categorised into four groups. Figure 6 (left) shows the proportion of each category to the total numbers of insight statements. Between novice and professional designers, there was the tendency that professional designers were more likely to construct the insight statements in SxS way, which contained the supposition in both object part and reason part than novice designers did. Moreover, among the insight statements that contained at least one supposition, the result of proportion became shown in Figure 6(right).

Novice designers wrote down 23 insight statements, while professionals wrote down nine statements. There were significant differences in the value that professionals were tended to write down SxS insight than novice designers did by proportion test. Figure 6(right) also shows that professional designers wrote more SxS insight than DxS and SxD. This result implies that professional designers wrote SxS insight when writing insight including suppositions.

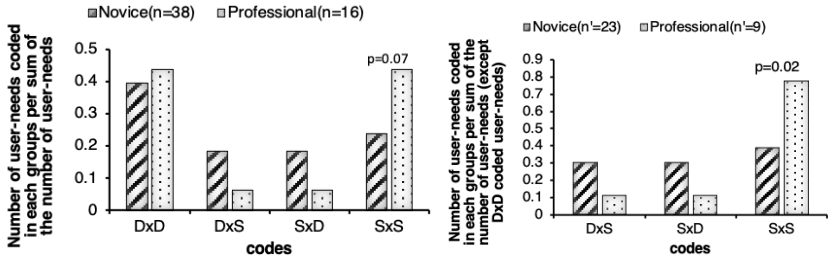

Figure 6. (left)The proportion of the coded user-needs / (right) Proportion of the coded user-needs (without DxD grouped needs)

4 DISCUSSION

We compared the insights creation process and insight statements between novices and professionals. The results show that there is no difference in what interview transcripts were used between novice and professionals. It means that the differences between novice and professionals lie in the analysis of the transcript. First, there were significant differences in the subject part of user needs for all three categories. This result implies that novice designers tend to generalise the user by his or her character. Jones (2008) described that using 'personas' can improve the creativity in design process when it is used to understand the user's nature. However, badly constructed personas, such as 'promotional personas,' may cause assumptions and preconceptions [11]. Hence, generalising users by their character might not be good because it limits the capability of empathy. The insight statements of professional designers were more likely to be coded as SxS group. In other words, professional designers put more suppositions in their insights than novice designers did. This tendency is consistent with interview results with designers, which is that novice designers can solve well-defined problems rather than discover and define design challenges by themselves [12]. The result implies that novice designers cannot reframe design challenges because they try to find problems literally in what they hear or observe, rather than what they

suppose based on the result of user research. The result made us speculate that novice designers did not empathise with the interviewees by using the taxonomy of empathy, such as perspective-taking. The novice designers might see the interviewees as a sort of system having problems that can be observed from outsides. Since the interview script was given to the participants as a document, it might have been difficult for the participants to immerse themselves into the interviewee's world, which is an important step of empathy in design [6]. The results also suggest that novice designers did not gain insight by a synthesis framework of "I know this" and "I saw this", which is used to identify insight from gathered user research data [4]. It might also be useful for novice designers to follow such a template which forces them to write down those aspects explicitly. The findings suggest novice designers should not generalise users by picking up one of his or her characters when verbalising the insight but should empathise with the individuals rather than picking up what is observed and interviewed. This study imitated a part of empathy and insight generation process within long design process. The longitudinal study of empathy in design is needed to expand this study's findings. The limitation of this study is the limited number of participants. It is also of interest for design education research to investigate how professional designers acquire the skills throughout their carriers.

5 CONCLUSIONS

This research aimed at revealing the differences between novice and professional designers at the stage of insight discovery in design process. As designers usually are required to find out the proper insight from complex user situations, empathy is a key technique to facilitate this challenge. As a result, this research found that there were mainly two differences. Novice designers tended to generalise the user by one of his or her character, which had a negative impact on empathy. Professional designers put more supposition in their insights than novice designers did. The results suggest that novice designers should not generalise the user by their character and try to empathise deeply with an individual user. This paper is a first step to analyse and support the insight generation of novice designers.

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