

User Role in Design Thinking Process

Radomila SOUKALOVÁ

Tomas Bata University in Zlín, Czech Republic, soukalova@utb.cz

Abstract:

This article deals with creative innovations and the process of their creation. Introducing new products, ideas and solutions to the market is a process that puts high demands on creativity and invention. This process is professionally called the "design thinking process" and it is a subject of this scientific article. The author's objective was to identify the design thinking process at the selected research groups, to understand the user role in this process and to compare the process course in relation to user. Due to variety of design thinking processes, a qualitative questioning was carried out in the form of an exploratory research (using the creative questionnaire). The aim was to verify whether the research method is appropriate and whether the obtained results would allow transparent processing. The article characterizes the theoretical basis of design thinking process, methodology and research procedure. The exploratory research processing results led into suggestion of topics that the researcher will use while working on the planned qualitative research-in the following year.

Keywords: creative innovation, design thinking process, user role, creative questionnaire,

Introduction

This study objective is to identify the role and importance of the user in design thinking process or, in other words, in process of designing creative innovations. The research subject was focused primarily on creative innovations related to product design (e.g. industrial design, furniture and packaging design).

The present time is characterized by constant technology development and by pressure of competition launching new products. Consequently, the consumer is exposed to a wide product range with different quality and different prices. For these reasons, some manufacturers place emphasis on price, others on quality or delivery method and its speed. The research subject, presented and observed in this study, are creative innovations, which, together with functionality, bring interesting new design solutions. This topic was monitored in the form of qualitative exploratory research which had been filled in by the students of product design field. At the same time, commercial companies, bringing particular creative innovations to the market, were approached. Researchers' efforts were to identify the user role in design thinking process, to identify positive and negative factors occurring at various stages and to reveal potential differences at research groups in the process of developing creative innovations. Given that this is exploratory research, the findings will be used to modify and propose a research method enabling to achieve research goals. Consequently, the results will be used as a complement to the theory of the design process and will be used primarily in the educational process of corresponding disciplines.

Theoretical basis

Creative process and innovation

The concepts of creativity, creative process and innovation are closely related to creative industries that are nowadays considered to be the most dynamic sectors in the world. These areas provide many interesting job opportunities and at the same time support creative thinking development and accumulate creative potential of particular areas.

Human creativity is the ability to bring new ideas, formulate them in complex and if possible real solutions, the so-called creative innovations. Creative innovations can be represented with both tangible and intangible solutions (Kloudová, 2010). Creative industries are part of culture that can be divided into 3 sectors:

- a) cultural sector: theatres, museums, libraries and galleries
- b) cultural industries: film, video, books and video games
- c) creative industries: architecture, advertising, design.

This study subject is to monitor and analyze design thinking process at educational institutions as well as at commercial organizations. In terms of culture, the study focuses primarily on creative industries, more specifically on product design.

Innovation transfer

is a process consisting in introducing new solutions (technologies, products) into practice, i.e. into production. Design innovation transfer is usually part of the new product development and product design changes are often considered to be significant innovations. The successful innovation transfer is completed when the entity (company) obtains or purchases the license or rights to production and subsequent sale. The process of transferring innovation is a very complex and lengthy process. For example, currently 16 licenses have been sold to a regional university in the Czech Republic, 7 of them represents design solutions and only 2 licenses are used in practice (www.utb.cz). Others continue to work on final proposals. These data show that transfer process is a very complicated long-term process and it is necessary to monitor and analyze it constantly. The goal of monitoring these processes is to identify critical points which make the transfer complicated or even impossible and eliminate their effects. The main element of innovation process and its subsequent transfer is the search for new ideas and solutions, the so called design thinking process.

Design role in organization and design thinking process

Design consists in creating communication means meeting the demands of esthetical quality and functionality. Design is to be seen in the context of current technical and economic possibilities. Design concept is nowadays perceived as a way of thinking, so called design thinking, which is applied in a creative approach to solve various assignments (strategic management area, communication strategy proposals, smart solution design, etc.)

We encounter design thinking process in an organization in many areas. These are part of the company creative potential- i.e. product design, corporate design as a unified visual style, design of service, communication, environment architecture and management.

Design is a gradual process through which the author goes while dealing with a specific assignment. This process usually takes place in several stages which are sometimes quite individual and sometimes typical of particular assignment type. It is necessary to be creative at each stage of creative process from assignment to finished work (Ambrose, Harris, 2011).

Design thinking is associated with a considerable amount of creativity but that does not mean that this process does not have its rules and a certain order. Design process is to be understood as a process controlled similarly to creative project. Creativity is just as important in design as its economic, time and organizational side. It is therefore necessary to perceive design process and thinking as a coordinated process leading to creative, innovative and possibly unconventional solution. For a particular design process, the author considers more solution options and can use different ways and mechanisms for final creative solutions.

Design thinking stages

For the study and research purposes, there were used the design process stages formulated by the authors Ambrose and Harris (2011, p. 12), who divided process of creating desired design into seven steps:

- a) **Definition area/brief** - it is necessary to define design problem and its target audience. The emphasis is put on the correct understanding of design problem and its constraints. Only this way we will achieve a solution that suits the client's expectations.
- b) **Research area** - these are activities related to searching for information about existing ways of similar solutions or their history; information about target group and possible obstacle identification
- c) **Ideate area** – consists in finding out needs and interests of the end-user and generating ideas to satisfy them, e.g. brainstorming, brainwriting, etc.
- d) **Prototyping area** - means to materialize ideas, present them to users, contracting authorities and designers in order to obtain their view and evaluation.
- e) **Selection** - compares existing solutions with assignment goals and selects the most appropriate ones. Some solutions may be practical but may not be the most appropriate.
- f) **Implementation** (sometimes we talk about transfer into practice) means the solution realization and its delivery to contracting authority.

g) **Learning area** – helps the designers to develop their creative thinking. The search for feedback of contracting authority and users provides information about satisfaction concerning the assignment goal fulfilment. For designers, this information is an inspiration of what to do next, or warning of what to avoid in the future.

The creative questionnaire, which was the research basis, was adapted to the above mentioned stages. (More about the research in the following chapters)

User role in design thinking process

As the article title itself states, the research interest is, in this case, also focused on identifying the user role in design thinking process. From content specification of particular stages in design thinking process (based on Ambrose and Harris, 2011, p. 12), we can identify the process parts where the user plays or should play a crucial role. The first area - brief - is related to the **client requirements specification**; the second area includes searches that, among other things, should bring as much information as possible about the **target group behaviour**. The third area is focused on thinking and ideating. Here, the user influence is minimal and all activities are concentrated primarily on innovative, esthetical and functional solutions. At the next process stage, a prototype is created to test all assigned requirements, including **user testing**. The solution of the following two phases, i.e. solution selection and implementation, is usually an agreement between contracting authority and designer. At these stages, the activities are focused on agreement about conditions of production and finished product delivery, financial conditions etc. In the last stage - learning - contracting authority should be interested in **client's satisfaction with product**, it is the so-called feedback. Based on content theory of design process particular stages, we can state that the user plays an important role in the process of design thinking at stages of brief, research, prototype creation and learning. The other parts, ideating and solution selection come under designers' own competences and their creative thinking. Solution selection is to some extent also in contracting authority competence which subsequently decides on product implementation.

Applying behavioural economics in design thinking process

In present time, in marketing context of market functioning, there is often discussion about how customers are influenced on the market; whether they behave merely rationally or are sometimes led by intuition. These questions can be answered using the so-called Behavioural economics. It is currently regarded as an economic area whose aim is to supplement the findings of classical, rational economics with the so-called "*unorthodox concept that can also see the emotional elements in economic factors and integrates into its analysis psychology and sociology knowledge*" (Thaler, R.H. 2017, cover). Kahneman D. and Tversky A. are considered to be its founders. They formulated, on the basis of their long-term research, the so-called prospective theory (Kahneman, Tversky, vol. 47, 263-292). With this theory, the authors explain ways in which people decide; they explain the principle of the so-called systematic choice; the way of thinking about profit and loss - not only as a result of rational and objective evaluation (based on economic calculations) but as a system in which a significant role is played with psychological aspects, i.e. cognitive principles (emotions, perceptions, judgments, etc.) also influence the result evaluation. In this context, Kahneman later divided human thinking into two separate systems: System 1 – is intuitive and "*works automatically and quickly with a small or no effort and without intentional control*" (Kahnemann, 2012, p. 27); system 2 - is analytical, often rationalizes and explains the decision, "*pays attention to the conscious, mental activities requiring it, including complex calculations*" (Kahnemann, 2012, p. 27). Lomes G. and Sugden R also deal with behavioural economics. In their research, Lomes G. and Sugden R., concentrate their attention on human preference analyzes while making decisions, with an emphasis on psychological aspects of economic behaviour (<https://www.wbs.ac.uk/about/person/graham-loomes>) (<https://www.britac.ac.uk/users/professor-robert-sugden>). Publication *The misbehaving* by R. Thaler continues in this comprehension stream and, in many examples, explains that a man, his thoughts and behaviour cannot be described by some patterns but need to be supplemented by human effect, i.e. it necessary to add the human dimension (New Bible of Behavioral Economics, 2018).

Given that design influences human behaviour, it is required to think about behavioural economic elements in design thinking process and its particular stages.

Objective and research questions

The article aim is to present results of exploratory research, which was focused on identifying the user role in design thinking process and on recognizing positive and negative factors in its various stages. The results will also be used to supplement the questioning methodology with behavioural economy elements.

Qualitative exploratory research was concentrated on monitoring the design thinking process at students of Czech and Slovak art schools and at commercial companies focused on product design. The partial research results were studied at each design process stage with the goal to identify particular problems.

Goal setting is based on the formulation of basic research questions and assumptions:

1. The product user role is an essential element in every stage of design thinking process.
2. Are there differences in concept and process of design thinking at students and at commercial companies?

Study subject

The research subject were students studying industrial and graphic design at Czech universities: 2 students at CTU Prague, 2 students at FMC TBU Zlín, industrial design field and 2 foreign graphic design students in Erasmus at FMC TBU Zlín. At the same time, 8 students from TU Košice, Faculty of Art from the Slovak Republic were involved. Two representatives of commercial companies from the Czech Republic also participated in this research.

Methods and methodology

The process of successful designing of a creative project, i.e. the design thinking process and eventual transfer into practice, is complex and long-term. The research main goal was to verify the proposed method on a sample of designers, both students and company designers. An important condition while selecting respondents was the realization of their own design thinking process (from beginning to their final proposals). In 2017 students participated in a project of FMC TBU called "Water for All", which had been also a research survey subject (Juříková, 2017). In this case, we wanted the participated students to describe their own design process.

Due to some quantitative questionnaire limitations, the qualitative questioning research method, in the form of the so-called creative questionnaire, was chosen instead. The creative questionnaire contained particular design process stages. At each stage, there was space for respondents' creative answers. They could complete their realized activities and at the same time identify the positive and negative elements they encountered at that stage. The creative questionnaire included opportunity to comment time-consuming steps at the particular stage. However, while evaluating the exploratory research, it has been found out that this figure has, in actual fact, no predictive value because the time spent on sub-activities is very diverse and does not have a major influence on the process and its finalization.

Content analysis of creative qualitative research was selected to evaluate the qualitative questioning resulting in the so-called Affinity diagram (Collins, 2017, p. 114). This method essence is to gather concepts into certain groups according to the idea affinity, then to identify important groups and create Affinity diagram. Using the exploratory research results, it will be verified whether this method can be applied for the following qualitative research, i.e. whether it is possible to create relevant concept groups according to idea affinity.

Research procedure

The exploratory research was conducted in May 2018 via qualitative questioning with creative questionnaire. In total, 14 students were contacted, from those 6 students and 2 representatives of companies were approached personally by a researcher who explained them purpose and answered any doubts. 8 students from the Slovak Republic participated electronically with identical creative questionnaire. When processing and evaluating the exploratory research, it was found out that the electronic way of contacting (however with the same content of creative questionnaire) is to a certain point influenced by students' attitude towards studies. Some of them responded responsibly, others did not take the questionnaire seriously which was obvious from their answers (their reactions were not included in the evaluation).

Design process course of exploratory research and its results

1. Assignment definition area

a) student group: design proposals were mainly studied on the basis of external company assignment or student own ideas: candy packaging, wooden toy design, armchair as a building kit, advertising milk box design, various types of furniture for one person, exhibition concept.

Positively was evaluated: freedom in designing the shape; possibility of visiting the contracting authority; searching for connections and possibilities of extending the proposals as a follow-up to previous researches; working on own ideas.

Negative perception was observed because of: unstable assignment (still changing); time-consuming work on design, motivation loss; many different product variants on the market (and therefore it is difficult to find a unique solution)

b) group of company representatives: there were solved their own ideas which could help the companies to bring innovative solutions such as a latex product and a set of modular tables.

The positive was seen, for example, in the new use of material (latex) and in constant improvement in product offer.

The problem was the search for target group and the foreign material import (liquid latex)

c) student group interviewed by electronic creative questionnaire: there were studied proposals from product design field such as sports clothes, food packaging, folding creative sitting, lighting clocks and bottle shelves, ergonomic vacuum cleaner, travel hanger, there was also a spatial design with proposal for product exhibition concept.

The students did not comment at all on their positive or negative elements at this stage.

2. Research area

a) student group I - they conducted researches concerning the product offer of contracting companies and competitive companies about what exists and what works; searching for suitable materials, searching in fairs and exhibitions; studying professional publications; searching for suitable colour designs, etc.

The availability of information materials was positively evaluated primarily thanks to the Internet. Students got an idea about offer in a particular area, got acquainted with material and technological elements. Thanks to the research, students realized problems associated with competition in design and technology solutions as well as the difficulty of finding a unique solution.

b) group of company representatives - there were conducted also historical researches which served to verify what had worked before and can work also nowadays with the use of new technologies. Positive side was they realized that no similar solution was found. Companies have not found any problems in this area.

c) student group II (interviewed by electronic creative questionnaire) - the research realization is perceived as an inspiration source from conceptual, material and technological perspective; they prefer consultations with experts; some students prefer initially working without internet and after getting their own idea, they start with detailed research.

The positive is seen in freedom and inspiration from environs. Due to a lot of information, the so-called information chaos emerges and it is necessary to sort out the information. They see problem in the fact when they find out that someone else was already solving the same assignment.

3. Ideation area

a) student group I - focused its activities on finding a concept that would meet the contracting authority requirements but would have an unconventional approach (such as a easily decomposable paper with seeds inside which are, after throwing off, sown etc.); on creating a convenient shape by sketching; discussions with contracting authority and various shape designs.

The positive for students was the process of finding ideas and the fact that it is a real proposal. Students were worried whether their design would be functional and feasible. Moreover, they were afraid of getting bogged down in problem cycle, feeling that they used the ideas of others and related awareness regarding the difficulty of inventing and proposing completely new solutions; fundamental changes in assignment.

b) group of company representatives formulated activities as a search for the use of material in a particular product, in form of brand brainstorming and connection of ideas with the realization, search for new ideas preventing them to get bogged down into a particular idea.

The positive was good customer responses at exhibitions where news is presented to users. The companies see a problem in unwillingness of potential users to pay a higher price for innovative solutions.

c) student group II – focused its activities on brainstorming and idea discussion with others, on market research and communication with people and producers. The positive concerned mainly cooperation with others and variety of proposals. The problems were seen in the conviction that the author's suggestions are the best, the unwillingness to approach changes resulting from discussions.

4. Prototyping area

a) student group I – was, at this stage, mainly concentrated on the prototype production from proposed materials, function verification, e.g. ergonomic, etc. Frequently, there are designed 3D models instead of the prototypes. Students say that this stage advantage is in discovering design shortcomings, in gaining arguments for choosing from many options, in feeling good when the model works as it should. Problems concerning this stage are: complicated teamwork; additionally they will realize how many ideas were unnecessary; financial and spatial limits; students must often make the models themselves.

b) group of company representatives - at this stage they focus their activities on the production of functional sample or prototype. They evaluate positively personal contact with clients and discussion about prototype; most of the produced prototypes are usually sold. A new revolutionary material use can cause troubled attitude of society or discussion about the use of that material.

c) student group II characterized this stage by the following words: material testing, component and prototype production, problem detection due to testing on multiple variants. The positive was the shortcoming detection. The problems were related to lack of time and space in the workshop; insufficient equipment in the workshop; little patience.

5. Selection of the most appropriate designs

a) student group I - was very disparate at this stage. Often only one design was proposed; sometimes selection was made only as "an idea"; sometimes selection was based on prototype functionality. Students commented positively consultations with experts. Problems arose, for example, by clients' constant modification of the production documentation.

b) Groups of company representatives - usually approach the design selection according to several factors (e.g. colour, variability, collection composition). This group evaluated positively the fact that new ideas are always "vivid" because always something must be adjusted and this is perceived as progressive power.

c) student group II characterizes this stage as a constant discussion with interested parties, while the solution is never final because there is always something changing. After the selection, they are happy, calm, content and satisfied with their own work.

6. Implementation area

a) student group I: the students' comments showed that some of the proposals were not implemented due to contracting authority absence - it was usually student own idea and assignment. Proposals that were based on the specific contracting authority assignment were implemented in cooperation with students. Positive feelings were experienced by students, whose designs were implemented, i.e. joy that their idea was realized and is functional. However, these had problems with lack of time and constant design modification.

b) group of company representatives - described this stage as absolutely trouble-free; they produce and sell the products. The positive is that the product sales are doing well which means that it was a good idea.

c) student group II: very similar comments to the student group I. Some of them assigned themselves to product production and then they present it to selected company. It is positive when the company begins to sell their product. Negative factors are mainly associated with studio work, finance and lack of time.

7. Learning area

a) student group I - clearly recognizes the design thinking process benefits such as getting product overview; understanding that reality is complicated because contracting authorities "do not often know what they want" and communication with them is often difficult, etc. Students are aware of problems they encountered during the process. They perceive this positively as a learning process for future projects. After discussion with contracting authority, many students are challenged by new, other solutions and they come to realize that people are learning all their life.

b) group of company representatives - at this last stage they consider the feedback from professional and general public to be the most important. Proposing new solutions brings them an advance in thinking in relation to design, use, etc.

c) student group II –they consider this stage as learning from their own mistakes; gaining new inspiration in other related fields; opportunity to discuss very amicably and to learn in this way for a whole life.

Result summary in particular stages

Stage 1 partial summary

In the case of students, the assignment is usually **their own**, for school work purposes; sometimes a company appears and assigns some briefs for student teams. Students appreciate **freedom while designing**; in the case of collective assignments they criticize **frequent requirements change by contracting authority**. (Students find their own assignments trouble-free in the context of processing). **Companies** consider this stage as an opportunity to look for new uses of existing materials or to launch new solutions and expand their offer. Problems are seen in the fact **they do not know target group** and also they see troubles in material field (related to specific material).

Stage 2 partial summary

Students regard the research area as an **inspirational and cognitive stage** (including the area of material and technological solutions). They do not encounter significant problems. **Companies** are very rational in this area; it is obvious they have more specific idea of what they want to solve and that is why their research is focused on specific elements.

Stage 3 partial summary

Students concentrated primarily on finding the **assignment concept**; ideating different proposals; discussing with other colleagues, contracting authorities, manufacturers and users. The positive is for them creative freedom, cooperation with others, variety of ideas based on real assignment. The problems are apparent in the conviction that original design is the best; the unwillingness to find a compromise solution. The negative aspect is also considered to get bogged down in problem cycle due to large amount of information found about different solutions.

Company activities are mainly focused on finding new solutions and their possibilities for design realization while they already have almost particular idea concerning the solution. Positive factor is good customer response, on the other hand, potential customers have a high price problem.

Stage 4 partial summary

Students focused their activities on material testing, prototype production or 3D models and they appreciated shortcoming detection and possibility to test multiple variants. The problematic aspect for them is teamwork, but also the fact that they can be left alone. Other problems are financial and spatial limits or insufficient studio equipment.

Companies have, based on previous experiences, a clear idea of prototype importance and they often treat it as a product allowing them contact with client or customer, sometimes resulting in the product sale. A disadvantage side can be observed in problematic, revolutionary use of material which is, for the society, difficult to accept.

..

Stage 5 partial summary

Students consider this stage to be very important because it is evaluation of their work. Unfortunately, these activities are related to solution feasibility and assignment purposes; whether the assignment was only for study purposes or for a realistic solution with the aim to make a product. If their proposal moves on to implementation stage, there occur problems with the production

documentation editing. This fact is regarded as a constantly "vivid idea" and its realization brings joy, tranquillity and peace.

Companies have similar opinion to students, but only when they are actually considering implementing their proposals. Similarly to students, they describe the new design proposals as "vivid" with constant modification and development.

Stage 6 partial summary

Students describe this stage differently – it depends whether their proposals were implemented or not. The

very fact that their proposals were realized is perceived positively, although many problems (e.g. **financing, lack of time, insufficient space in workshops or studios, etc.**) are associated with it.

Companies consider this stage as the beginning of product sale and they perceive it as a confirmation that

their proposal was correct and that they had gone in the right direction.

Stage 7 partial summary

Students perceive this last stage as an opportunity to get experience with the whole design thinking process. They are ready to use these experiences in other similar projects and they understand that each design process is unique but the problematic process parts and themes are usually repeated.

Companies, in this stage, make good use of their previous experiences gained while working with similar processes. And they consider feedback from potential users as the most important aspect.

Discussion and conclusion

The exploratory research evaluation has characterized particular design process stages from the point of view of students and commercial company representatives. The partial conclusions of design thinking process stages and their summary has revealed the topics of the so-called idea affinity. Terms used in questionnaires were grouped according to the idea affinity and then relevant groups were created to make the Affinity diagram: idea freedom; use of new materials and technologies; brief; teamwork; workshop and studio equipment; testing (prototype, product); user comments; gained experience; satisfaction with own work. These topics related to the idea affinity will be used to prepare and process a qualitative research which will be, based on the exploratory research results, carried out in the spring of 2019.

The exploratory research was also focused on understanding the user role in design thinking process and his importance for research groups. Based on the Ambrose and Harris theory, the user role is significant in the following stages: assignment, research, prototype production and learning. Students' statements show that they do not think much about the user and his opinion. Not even in one stage students dealt with the user. Company representatives were concerned with the user at the stages that are listed in the professional publications of the authors Ambrose and Harris. This fact is probably related to their experience in design thinking process. The comparison shows that students need to be constantly reminded of the user role and it is important to encourage students to monitor and identify potential users.

Reference

Books

Ambrose, Harris (2011), *Designové myšlení, Grafický design*, Computer Press, a.s. Brno, ISBN 978-80-251-3245-6

Collinsová, H. (2017): *Kreativní výzkum, Teorie a praxe výzkumu v oblasti tvůrčích odvětví*, Institut umění –Divadelní ústav, ISBN 978-80-7008-386-4

Kahneman, D (2012).: *Myšlení, rychlé a pomalé*, Jan Melvil Publishing, s.r.o. ISBN 978-80-87270-42-4, 542p.

Kloudová, J. a kol.:*Kreativní ekonomika*, (2010), 1.vyd. Grada Publishing, 218 p. ISBN 978-80-247-3608-2

Strauss, A., Corbinová, J. (1999) *Základy kvalitativního výzkumu*, Nakladatelství Albert Brno, ISBN 80-85834-60-X

Šviráková, E. (2014), Kreativní projektový management, VerRBum Zlín, 1. vyd. ISBN 978-80-87500-58-3

Thaler, R.H. Sunstein, C.R. 2010): *Šťouch*, Kniha Zlín, ISBN 978-80-87162-66-8

Thaler, R.H. (2017): *Neočekávané chování, příběh behaviorální ekonomie*, Argo, 2017, ISBN 978-80257-2121

Online Journals and websites

Kahneman, D., Tversky, (1979)A.: Prospect theory: An analysis of decisions under risk. *Econometria*, vol. 47, 1079, pp. 263 – 292, https://www.jstor.org/stable/1914185?seq=1#page_scan_tab_contents

Klasla, J. (2018): Nová bible behaviorální ekonomie: http://ceskapozice.lidovky.cz/nova-bible-behavioralni-ekonomie-d42/recenze.aspx?c=A170529_133037_pozice-recenze_lube

Šviráková, E, Bianchi G (2018): Design Thinking, System Thinking, Grounded Theory, And System Dynamics Modeling-An Integrative Methodology For Social Sciences And Humanities, In Human Affairs-Postdisciplinary Humanities & Social Sciences Quarterly Vol. 28/3 312-327p.

Conference paper

Juříková, M.(2017): University Attitude to the Applicability and Solution of the Society-wide Problem of Water Management, in *Vision 2020: Sustainable Economic Development, Innovation Management, And Global Growth*, Vols I-Ix, 2017, Edited by:[Soliman, KS](#) , 2764-2770p.