COMPETENCE DEVELOPMENT OF PRODUCT DESIGNERS IN THE CONTEXT OF LABOUR MARKET NEEDS

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Abstract

The needs and demands of the global labour market affect many professions and have long shaped the field of product design. This premise became the basis for a research study that aimed to map the core competency set of product designers - students and professionals - that the profession requires beyond professional knowledge and skills. These are the soft skills that designers necessarily use in the context of interdisciplinary teamwork. In our research, we worked with students from three universities in the Czech Republic and China, while exploring the needs of professional designers. The research was based on a case study using innovative research methods combined with quantitative and qualitative data processing. The results of this field research were compared with professional studies that have mapped product design labour market needs over the past five years. The research findings were quite surprising, as the preferred soft skills of the respondents are also in demand in the global labour market according to international studies. This implies that product designers need them for a successful career. The survey identified the most important competencies, such as teamwork, problem solving, effective communication, time management and others. Thus, the results of this comparative investigation provide a great opportunity for curriculum development in both higher and secondary education settings with a focus on design, with emphasis also on developing the competency set needed for interdisciplinary teamwork.

Keywords: interdisciplinary cooperation, competencies, product design, labour market

Abstrakt

KOMPETENČNÍ ROZVOJ PRODUKTOVÝCH DESIGNÉRŮ V KONTEXTU POTŘEB TRHU PRÁCE

Abstrakt: Potřeby a nároky globálního pracovního trhu zasahují do mnoha profesí a dlouhodobě formují i oblast produktového designu. Toto východisko se stalo základem pro výzkumnou studii, jejímž cílem bylo zmapovat základní kompetenční výbavu produktových designérů - studentů i profesionálů, kterou tato profese vyžaduje nad rámec odborných znalostí a dovedností. Jedná se o soft

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skills, které designéři nutně používají v rámci týmové mezioborové spolupráce. Při výzkumu jsme pracovali se studenty ze tří univerzit z České republiky a z Číny, a zkoumali jsme zároveň potřeby profesionálních designérů. Základem výzkumu se stala případová studie s využitím inovativních výzkumných metod v kombinaci s kvantitativním a kvalitativním zpracováním dat. Výsledky tohoto terénního výzkumu byly porovnány s odbornými studiemi, které v posledních pěti letech mapovaly potřeby pracovního trhu v oblasti produktového designu. Závěry výzkumu byly celkem překvapivé, protože preferované soft skills u oslovených respondentů jsou podle mezinárodních studií také požadované na globálním pracovním trhu. Z toho vyplývá, že je produktoví designéři potřebují pro svoji úspěšnou kariérní dráhu. V rámci šetření došlo k identifikaci nejdůležitějších kompetencí, jako např. týmová práce, řešení problémů, efektivní komunikace, time management a další. Výsledky tohoto srovnávacího šetření tak dávají velkou příležitost pro rozvoj studijních plánů v prostředí vysokého, ale i středního školství se zaměřením na design s důrazem i na rozvoj kompetenční výbavy potřebnou pro interdisciplinární týmovou spolupráci.

Klíčová slova: interdisciplinární spolupráce, kompetence, produktový design, trh práce

INTRODUCTION

With the acceleration of robotics in industry and services, the needs of the labour market are clearly oriented towards interdisciplinary collaboration. This also applies in a very significant way to product design, that has long been an example of interdisciplinary collaboration ... if we are talking about the creation of new products that require the cooperation of experts across different disciplines. Our society is also digitizing very quickly. In recent years, digital technologies have made it possible for the general public to communicate online via the Internet and other computer software tools. This trend has also affected the field of design.

However, in the case of interdisciplinary teamwork, it is often very beneficial for teams to be able to physically meet and work on common tasks. Designers (especially product designers) also prefer this way of communication. In 2020, due to the COVID-19 virus, teamwork has had to move online, which requires a greater emphasis on the soft skills of team members to work together successfully and effectively.

This study investigated the soft skills of product designers (students and professionals) need to work successfully in an interdisciplinary team in a digital environment and compared the results with the requirements of the labour market needs in this area. Teamwork leads students to critical reflection and can prepare them very well for professional design practice (Findlay, 1997).

Research design compares the preferences in soft competencies of a group of product design tudents from three universities with the preferences of professional product designers and takes into account their different experiences with interdisciplinary teamwork. It is important to compare these findings with the needs of the labour market, that have been analysed from international studies in recent years.

The term “interdisciplinarity” is not confined only to academic settings, because it involves the combining of two or more disciplines as can be for instance research project. There are several processes that can improve interdisciplinarity, such as ongoing coordination (Sveen *et al.*, 1999), the assessment process (Avlund *et al.*, 2002), and flexibility (Nancarrow, 2004). We can then consider as an “interdisciplinary team” a group of experts (students), who are from several different fields (designers, engineers, economists, technologists, medics etc.) and who work together toward a common research goal or project (Nancarrow *et al.*, 2015). Teamwork can significantly support the development of student skills, not only professional, but especially soft skills (Meizlish & Anderson, 2018).

“Soft competencies” help people in their self-development, that is, at work and in their personal lives. Most of them are, for example, competencies focused on communication, problem solving, time management or flexibility and thus indicate social interaction (Matteson, Anderson, & Boyden, 2016). Hard skills, as opposed to soft ones, are specific to a particular job also in product design. The meaning of individual specific soft skills differs slightly, but the aim of this study was not to unify their definitions, because in general the meanings of these competencies are clear.

1. METHODS

Interdisciplinary teamwork is best done when team members can meet, see each other, discuss

problem-solving, and reach proposed goals together. However, the global pandemic situation during two years has forced many such teams to communicate online. The research therefore focused on examining the skills that team members need for their online work. The survey combined traditional and innovative methods, which Walker (2018) calls *"journalistic investigative methods"*. It was an innovative approach combined with a quantitative analysis (questionnaire) and a qualitative analysis (interview with respondents). The individual elements of the research were based on a case study that defined the overall research environment. A total of 98 respondents were involved in the international research - 86 product design students from 3 universities and 12 professional product designers.

2. CASE STUDY

The case study maps the soft skills of product design students and professional product designers who have experience working in interdisciplinary teams and during 2020 implemented their teamwork online due to the global coronavirus situation. However, it is not limited to field research alone. Its aim was to compare the results with the requirements of the global labour market from already published international studies and to create a set of competences that designers cannot do without in interdisciplinary teamwork, either online or in the future in standard communication. This approach can thus show how the competences of students or professional product designers can be strengthened in the long term. Innovation in all areas of product design currently requires greater collaboration between different professions, and designers are usually key elements of teams. Working in a team is primarily working with people. This can stimulate wider student interest and motivate them to work in a team (Yanamandram & Noble, 2006). Due to the fact that the information is commonly available online and work communication has also been significantly digitized during this year. Students no longer have to go to their school for know-how, because it is globally available (Han, H-Ch. *et al.*, 2017).

Based on these parameters, 86 product design students from three universities and 12 professional product designers were selected for the research. Students were from the following universities: 1) Ladislav Sutnar Faculty of Design and Art, University of West Bohemia in Pilsen, 2) School of Design of East China Normal University in Shanghai, 3) College of Engineering and Design of Hunan Normal University in Changsha.

The reason why this research was aimed at students in the field of product design and also at professional product designers was that these experts often come into direct interaction with other experts when developing new products and thus work in smaller or larger teams. In addition, the global pandemic situation has made contact teamwork impossible and has made it only in digital version. Research of the competencies needed for this type of collaboration by product designers was more or less logical.

The selection of respondents to international research was conditioned by the fact that selected students and professional designers from three universities had to work on at least one interdisciplinary project during 2020.

Interdisciplinary projects are implemented in different ways at each of the mentioned universities and have different demands. For the needs of the case study, we determined the basic parameters of interdisciplinary projects:

- the project was solved online during year 2020,
- the solution of the project was possible only in cooperation of students/professionals from several different fields (technical engineering, agriculture, humanities, medical studies, economics, design, etc.),
- students/professionals of product design were involved in the project, work in teams together with students of other disciplines and had divided roles and responsibilities in their teams (team manager, developer, content guarantor, marketing strategist, etc.),
- the project assignment was formulated according to the practical needs of the university or in cooperation with business partners,
- students/professionals had the opportunity to continuously consult their work with the client of the topic online,
- several student teams worked simultaneously on one project assignment, and the contracting authority finally chose the best team solution,
- the output of the project was, for example, a model, a prototype, a functional sample with an accompanying description of key areas from each participating field.

Giving more responsibility to student teams, including their original authorship, often leads to unexpected, effective, and innovative results, and also provides students with a unique learning experience (Stewart & Clifford, 2018).

A basic research question was defined for the needs of the research: *What area of competences do product designers need to develop in the context of the needs of the labour market?*

Investigative journalistic research methods were used for this research study, which combine an analytical and synthetic approach and consider additional interviews with some respondents. The used questionnaire contained 15 pre-defined soft competencies, that were selected on the basis of data comparison based on international research of labour market needs in the field of product design. These had to be studies that: 1) were not older than 5 years, 2) have been published online, 3) worked with more than 100 respondents. Only 2 documents met these requirements:

- Designing a Future Economy from Design Council's 2017 investigating report,
- 2019 Product Design Hiring Report first global survey of InVisionApp.

Each of the respondents had to define the seven most important soft skills through a questionnaire. The selection of seven competencies violated the standard preferential scaling, which is quite often like school grading. The research goal was to preferentially cover almost half of the offered options, but at the same time there should be no traditional way of classification. In such a case, it is a so-called Likert scale, where respondents state the degree of agreement and disagreement with various statements, opinions, attitudes, objects, persons, or events. Scales usually contain 5 or 7 points, and the attitude score is mapped (Tahedoost, 2016).

The results of the preferred competencies were analysed and summarized. In addition, an online structured interview was conducted with some respondents, the aim of which was to map the designers' experience with interdisciplinary teamwork focusing on the skills needed in the digital age and also with needs of labour market.

Working with international studies dealing with the needs of the labour market in terms of soft skills of product designers for interdisciplinary cooperation included, as already mentioned, a precise selection of appropriate documents. In the end, we could work with only two published studies for research purposes: 1) Designing a Future Economy from Design Council's 2017 investigating report; 2) 2019 Product Design Hiring Report first global survey of InVisionApp.

Another research question was chosen to work with these documents: *What competencies in the field of product design does the global labour market require?*

Comparing their conclusions with the results of international research in a group of product design students and professional designers provided a deeper insight into the issue of soft competencies. The conclusions have significant innovation potential, as it combines education and other skills (Staskevica, 2019). Based on this knowledge, it is then quite easy to prepare additional training courses and thus strengthen the necessary competence of product designers.

3. RESULTS

Digital tools that currently enable better and better online communication (regardless of national borders) are not the ultimate solution, as communication is managed by people. While it is not a problem to share documents, talk to each other or see each other through modern technology, this does not mean that this communication will be effective and efficient (Getto & Amant, 2014). This aspect therefore has a key influence on teamwork and especially interdisciplinary cooperation and is also related to soft competencies, that as in the offline world, are used for joint creative activity.

The questionnaire survey of 86 student-respondents showed that the most important soft skills for on-line cooperation include: teamwork, effective communication, problem solving, time management, flexibility, empathy, and stress resistance.

The mentioned business skills can also be considered important, but they were preferred only by students of Chinese universities. The reason why is the realization that the product designer must also be able to offer his design work on the market, to trade it.

Here are the comments of 4 student-respondents on the choice of preferred competencies:

- "The most difficult for us was to find the way how to organize our work and how to communicate effectively." (Jenny, student of product design, on-line interview, June 28, 2020)
- "With respect to other professions, it's important to be open. Listen, keep your eyes open, and then be able to look easily from above and between lines. The most important invention for such collaboration is certainly communication." (Stephan, graduate student of product design, on-line interview, June 29, 2020)
- "I never thought it could be that difficult. Although we talk, see each other, it also takes a long time

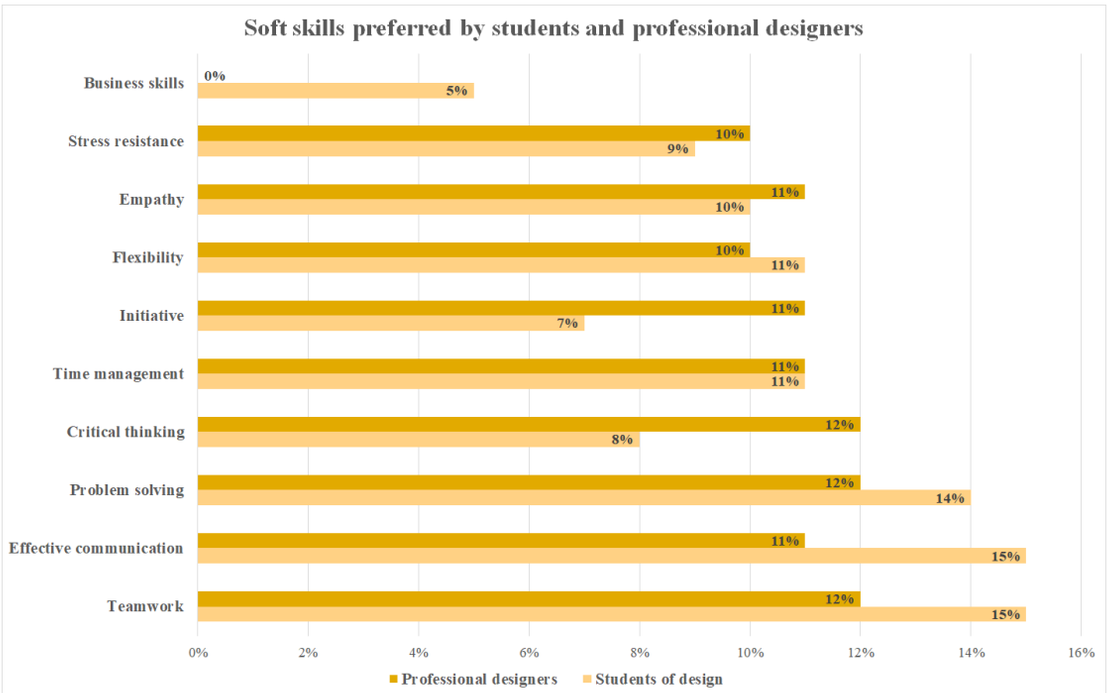

Figure 1: *Results of international questionnaire survey of student and professional respondents.*

to clarify all the details and understand some of the things in our work. Misunderstandings are actually our everyday life." (Lucy, student of product design, on-line interview, June 28, 2020)

- "I perceive it positively. We will arrange everything you need online, and communication is simple. Definitely more than ever before." (Carl, student of product design, on-line interview, June 30, 2020)

A survey of 12 professional product designers, who have worked with their teams online in recent months, shows that the most preferred soft competencies are: problem solving and critical thinking, followed by teamwork, effective communication, time management, initiative and empathy (with the same percentage).

And here are the comments of 3 respondents on the choice of preferred competencies:

- "Product designers often need to integrate various factors to advance their work. The most difficult part may be to understand how to balance different demands at all levels." (Jan, professional product designer, on-line interview, June 22, 2020)
- "Effective communication and clear division of labour." (Peter, professional product designer, on-line interview, June 24, 2020)
- "It depends on the composition of the team and the communication we lead with each other. Being able to meet would be faster. From my point of view, all competencies are therefore very important." (Lukas, professional product designer, on-line interview, June 25, 2020)

The aim of the final comparative analysis was to identify the most frequently preferred competencies between the two groups of respondents. The research shows that each of the addressed groups prefers some competencies more, but in some they also agree:

- teamwork, effective communication, or problem solving (product design students),
- problem solving, critical thinking, teamwork (professional product designers).

Students also mentioned flexibility and stress resistance, and professional designers mentioned initiative and critical thinking. We can say that the differences in the preferences of the respondents result from their different experiences with interdisciplinary teamwork.

In case of document comparison: 1) Designing a Future Economy from Design Council's 2017 investigating report; 2) 2019 Product Design Hiring Report first global survey of InVisionApp the research method of comparative data analysis was used. Both studies were international research character, not older than 5 years, were published online and worked with more than 100 respondents.

Designing a Future Economy from Design Council's 2017 investigating report - this report

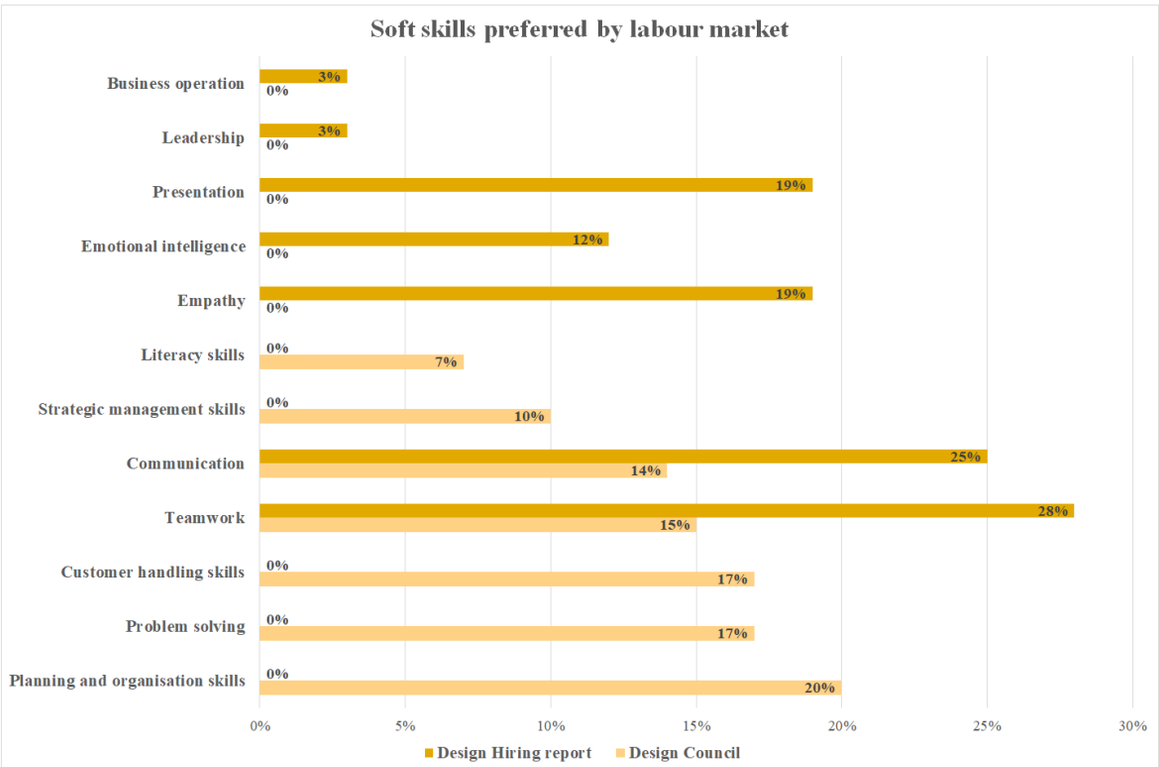

Figure 2: *Results of international research by Designing a Future Economy from Design Council's 2017 investigating report and 2019 Product Design Hiring Report first global survey of InVisionApp.*

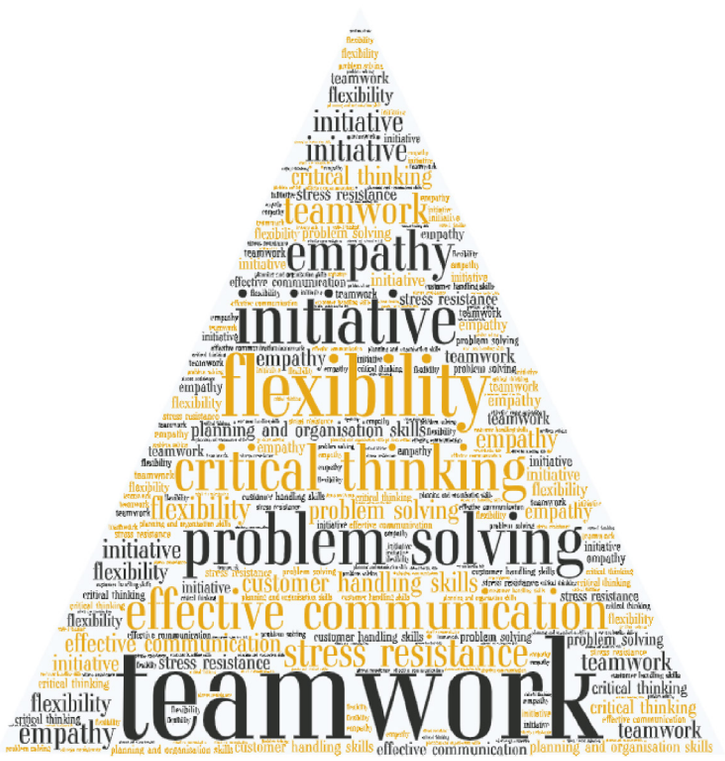

Figure 3: *Word-cloud of competences, that reflexes result of international research with data analysis.*

was based on partial studies in which several thousand respondents participated – individuals and companies (employers). The research examines the skills that differentiate design from other sectors in the UK economy. The skills were self-defined by respondents and they may differ slightly in meaning.

2019 Product Design Hiring Report first global survey of InVisionApp – this study focused on 1,635 respondents from United States, United Kingdom, Canada, Germany, Australia, Singapore, and New Zealand. Also, in this study, there was no unified methodology regarding the definitions of individual skills. The skills were self-defined by respondents too.

However, this discrepancy in the area of definitions of individual competencies is not an obstacle for the comparative method of working with data in this case. The aim was to map what type of competencies the labour market requires in the field of product design, but not to deal with the detailed meaning of individual competencies. The basic content intelligibility is evident in both studies, so there can be no fundamental confusion between the content and the meaning of these competencies.

The most preferred competencies on the labour market therefore include:

- teamwork, communication, planning and organisation skills, empathy and presentation skills,
- problem solving and customer handling skills were also preferred.

The preparation of the word-cloud model was based on an analytical-synthetic-creative mind-set, so that it connected the data obtained by international research of product design students and professional designers with the analysis of the needs of the global labour market. In this case, the preferred competencies were grouped and graphically processed. This created a system of the most necessary skills in the field of product design, that reflexes result of international research with data analysis.

CONCLUSION

Global labour market still requires specific competence needs in the field of product design that help designers to work successfully in interdisciplinary teams, regardless of the way and form of work (online/physically). This is a group of soft competences that can also be applied through digital technologies and which, based on international research, young designers have used in their projects. Being successful in a team is not just about being the best product design expert. Soft skills are one coherent set of skills. They are important for team interaction and the research described above shows that their importance in the digital age is no less than in the face-to-face era. While the tools for interdisciplinary creativity may differ, shift and evolve in light of digitalisation (McIntyre & Watson, 2011), the principles of their use remain similar. The case study therefore maps the soft skills of product design students from three universities and professional product designers - all of whom had experience of working in interdisciplinary teams in 2020. The results of the international survey showed a certain congruence in their experiences in parallel also with the global labour market needs and can significantly help in the design of training courses and workshops to develop the soft competences not only of product design students but also of professional designers.

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