Article

Diagnostics of the Design Thinker Personality Profile with the Big Five Assessment for Educational Work

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Abstract

Design Thinking as an innovation approach has gained relevance in the professional context and is increasingly used to solve interdisciplinary problems. In the current research literature, there are some heuristic approaches of Design Thinking that experts have described as the personal abilities of a Design Thinker, which have proven to be beneficial in practice. However, there has been no measurement of the necessary personal skills for Design Thinking. The early diagnosis of process-inhibiting personalities would be profitable for a Design Thinking coach in that certain didactic interventions could be implemented proactively, so that foreseeable disturbances within the Design Thinking process can be counteracted. For this reason, a corresponding procedure for diagnosing the expected Design Thinker skills of the students at the Münster School of Vocational Education was developed. Using the Design-based Research approach, a Design Thinker Personality Profile was designed regarding the Big Five personality traits. The developed Design Thinker Personality Profile could be reviewed by the individual personality profiles of the students and the impressions of the lecturers regarding the personality attitudes of the students.

Keywords: Big Five Assessment, B5T, Capabilities, Design Thinker, Personality Profile.

1 The interest in the early diagnosis of personalities for the multidisciplinary teams in Design Thinking

Design Thinking is a structured approach to solve complex problems, which is now used in many areas and helps to develop new ideas. The Münster School of Vocational Education (Institut für Berufliche Lehrerbildung) has also been offering a seminar called "Future Workshop" (ZukunftsWerkstatt) for students of the teaching profession for vocational schools for the past six years. In this seminar, students are introduced to the method of Design Thinking and then entrusted with an innovation project for school development (Krüger, 2019). In practice so far, most students have been open to Design Thinking and have recognized its added value for themselves. The observation of the seminar by the teachers showed a consensus in the finding that some of the learners had difficulties in engaging in Design Thinking due to their personalities. However, these personalities cannot be identified at the beginning of the seminar because the

learners are not all personally known by the teachers and thus an intervention is not possible at first. Linking measurable personality traits and successful participation in multidisciplinary teams is a heuristic for which there are no approaches in the literature to date. For this reason, the use of a diagnostic tool at the beginning of the work in Design Thinking within teaching appears to be particularly important. The early diagnosis of process-inhibiting personalities would be beneficial for the teacher insofar as certain didactic interventions could be implemented proactively so that disturbances within the Design Thinking Process that are very likely to occur can be counteracted. Developing a feedback process can lead to better educated design thinkers who can manage the demands of today's workplace.

A look into personality psychology shows that there is no unified theory to explain the structure and differences of personality. Rather, different currents have emerged within the empirical science of personality psychology that take different perspectives on the experience and behavior of people (Herzberg & Roth, 2014, p. 1). There is a growing consensus that the most important characteristics of a person can be described by a personality model with five comprehensive factors (also called personality dimensions). Accordingly, the American psychologists Costa and McCrae succeeded for the first time in plausibly demonstrating that there are five stable dimensions of personality that exist independently of cultural areas and the type of sample (Fehr, 2006, p. 114). The theoretical Five-Factor Model according to Costa and McCrae includes the personality dimensions: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness (McCrae & Costa, 1999, p. 143). Meanwhile, there are a large number of personality inventories worldwide, which were developed by psychologists and are available for various research purposes. Since diagnostics using the Big Five has proven to be the most valid and reliable measurement within research, the Big Five personality model is still the subject of most high-quality personality inventories today.

In numerous studies, analyses of the connections between the Big Five personality traits and creativity and innovative ability in professional contexts can be found. For example, Potočnik and Anderson (2017, p. 304 ff.) analyzed the relationship between the Big Five and innovative performance in the workplace. Out of it, they derived certain values of the Big Five personality dimensions (for example high values in the Openness to experience dimension), which are achieved by those candidates who are most likely to be innovative performers in the workplace (Potočnik & Anderson, 2017, p. 306). The Hasso Plattner Institute (HPI) also published studies in the context of design thinking research, in which the results of a Big Five personality test were used for team creativity analysis. In addition, the HPI and other pioneers of the Design Thinking doctrine provide comparable heuristics on the personal abilities of a Design Thinker. However, the measuring of the necessary personal skills for Design Thinking has been lacking so far, therefore an appropriate tool has now been developed. This was accomplished with the help of a research approach called Design-based Research (DBR approach), whose field of application lies within the framework of design and development-oriented research. The DBR approach involves the development of solutions for open problems. Thereby, this approach aims to link science and practice more closely by developing innovative solutions specifically for practice and allowing them to be tested in practice at the same time (Reinmann, 2005, p. 62). This research project aims to develop a solution for diagnosing the expected Design Thinker skills of students when performing the Design Challenge. The development oriented DBR approach was predestined for this project.

2   Research Design: Design-based research approach (DBR approach)

The DBR approach is rooted in the American educational research, which places the design and testing of an intervention, the so-called design experiment, at the center of the research process (Gess et al., 2014, p. 11). Other fundamental characteristics of design-based research are that the intervention should be adapted to the specific context of reality and that the combined use of different research methods is possible (Gess et al., 2014, p. 11). The research methods are not specified because different goals require different methods. Thus, the research approach only specifies the necessity of formative evaluation (Reinmann, 2005, p. 59). With the help of the DBR approach and its iterative procedure, an instrument for the diagnosis of the expected Design Thinker capabilities was developed. Through "cycles of design, implementation, analysis [evaluation] and re-design" (Reinmann, 2005, p. 62) the measurable requirement profile of a Design Thinker could be designed, tested, evaluated and modified. The literature of the DBR approaches of various authors shows that the design process is characterized uniformly by this specific phase sequence.

All phases are preceded by the exploration of the field: the *problem analysis*. Edelson (2002) understands problem analysis as "characterizes the goals, need, or opportunity that a design is intended to address together with the challenges, constraints, and opportunities presented by the design context" (p. 109). In the following first phase, potential solutions to the problem are designed, and theoretical and practical findings are incorporated. Accordingly, a prototype of the intervention is constructed to solve the specific problem (Gess et al., 2014, p. 12). This phase is called *Design-Draft* or *Design* for short. In the next phase, the intervention is tested in a natural setting. This means that the developed intervention is applied in practice. This phase is called *Design-Implementation*. The following *phase Design-Evaluation* serves to verify the intervention by collecting data that provide information about the reliability of the intervention. This is followed by the interpretation phase, which leads to a mature *Design-Solution* and theory development or requires a *Re-Design* of intervention and survey instruments (Gess et al., 2014, p. 12). If the second is the case, at least one further iteration or even several iterations follow until the optimal Design-Solution is available.

3   Problem analysis and analysis of theory and context (exploration)

Due to the problems described above, a procedure was developed to diagnose the expected Design Thinker abilities of students working in the Design Thinking process. This procedure made it possible for the lecturer of the seminar "Future Workshop" to identify the process-inhibiting personalities directly at the beginning of the seminar. Thus, didactic interventions (listed later) can be implemented at the beginning of the seminar. In order to measure the qualification for the work in the Design Thinking process, a requirements analysis was used. This analysis can be used to determine which requirements a student brings with him/her for working in Design Thinking and how a requirement profile of an ideal Design Thinker should be designed with regard to the Big Five. Accordingly, an explorative approach is chosen, which is based on the theoretical knowledge of the Design Thinking community regarding the personal abilities of a Design Thinker on the one hand, and on the reliable Five-Factor Model of personality psychology on the other.

Utilizing a comprehensive literature research, the current heuristics on the personal abilities of a design thinker was summarized and explained for the requirements analysis. Clearly, Design Thinking research has neither agreed on a uniform definition of personal abilities nor on a specific number of abilities that a Design Thinker should possess. Rather, the literature contains several

heuristics of different authors listing certain personal abilities of a Design Thinker that have proven to be beneficial in practice (Brown, 2008; Freiling & Harima, 2009; Freudenthaler-Mayrhofer & Sposato, 2017; Gerstbach, 2008; Owen, 2006; Plattner et al., 2009). To make it clearer, a uniform designation is used here: the skills that a Design Thinker should possess are summarized under the term *Design Thinker Capabilities*. The so-called *Design Thinker Capabilities* are all abilities that an ideal Design Thinker possesses, who successfully works in a multidisciplinary team and can fully utilize his or her personal potential for the Design Thinking process. The summary of a Design Thinker's abilities shows that the ideal Design Thinker can be described by a certain repertoire of skills. Consequently, a successful Design Thinker is *empathic, open, able to work in a team, eager to experiment, optimistic, communicative, curious, creative and has the ability to visualize and think integratively*.

Each ability, according to the literature reviewed, is divided into different facets that describe intrapersonal characteristics. These mentioned skills could be related to the Big Five personality dimensions by means of an analysis, which resulted in a requirement profile for an ideal Design Thinker. To make valid statements about the expected Design Thinker capabilities of the students, the developed requirement profile was compared with the individual personality profiles of the students, which were collected through a proven personality inventory. The Big Five Personality Test (B5T) developed by the psychologist Lars Satow was used. Satow has developed a variety of psychological tests that may be used free of charge for non-commercial research and educational purposes. In particular, his B5T is well known beyond national borders and is one of the most widely used psychological personality tests in the German-speaking world (Satow, 2006).

4   Creating the *Design*: Theory-based development of an intervention

In the first phase, Design of the DBR approach, a potential problem solution was designed. For this purpose, current theoretical findings of Design Thinking research were incorporated by applying the already popular process-enhancing Design Thinker Capabilities that resulted from the literature research. As a potential problem solution, a requirement profile for an ideal Design Thinker, the so-called *Design Thinker Personality Profile*, was designed with the Big Five in mind. Therefore, an analysis of the relationship between the *Big Five* personality dimensions on the one hand and the *Design Thinker Capabilities* on the other hand was conducted. To analyze the correlations, the descriptions for the big five personality dimensions are hermeneutically compared to the descriptions of the facets that emerged from the literature review. The results of this analysis were documented in table form, so that finally the Design Thinker Personality Profile could be derived. In the next step, this profile was compared with the individual personality profiles of the students in order to draw conclusions about the expected Design Thinker Capabilities of the students. In this way, the diagnosis of the Design Thinker Capabilities can be made possible or rather, the "fit for the work" in Design Thinking of each seminar participant can be predicted at the beginning of the seminar.

The following table shows the exact relationship between the ten Design Thinker Capabilities and the five personality dimensions (Big Five). As the legend below the table illustrates, positive to extremely positive (+, ++, +++) as well as negative to extremely negative (-, --, ---) correlations can be seen. For example, the correlation between *agreeableness* and *the ability to work in a team* proved to be extremely positive, because people with a high degree of this personality dimension are team players, cooperative and helpful. The empty fields illustrate that no correlation could be found at this point.

Table 1. Big Five personality dimensions

		Big Five personality dimensions				
		Neuroticism	Extraversion	Openness to experience	Agreeableness	Conscientiousness
	Empathy		+	+ + +	+ + +	
	Openness	- -	+ +	+ + +	+ +	
	Teamwork ability	- - -	+ + +	+ +	+ + +	+ +
	Eagerness to experiment	- - -	+ +	+ +		
	Optimism	- - -	+ +	+	+	
	Integrative thinking			+ +		+ +
	Communication skills	- -	+ + +	+	+ +	
	Curiosity	- -	+ +	+ + +		- -
	Ability for visualization			+		
	Creativity			+ + +		- -

+, + +, + + + = positive, strongly positive, extremely positive correlation

-, - -, - - - = negative, strongly negative, extremely negative correlation

Empty field = no connection detectable

(left margin label: Personal capabilities for Design Thinking)

The analysis is illustrated in detail using the personality dimension *neuroticism* in connection with the *Design Thinker Capabilities* as an example: People with a high degree of this personality dimension are anxious, unstable, insecure and sensitive. Regarding the Design Thinker Capabilities, however, negative emotionality is rather inappropriate. An ideal Design Thinker is *open to new ideas and experiences* - anxiety and insecurity hinder rather than encourage the open mindset that is important for the Design Thinking process (table: strongly negative correlation). Personality traits such as resilience, self-satisfaction and balance are also necessary for *teamwork and collaboration* (table: low degree of the dimension neuroticism). People who are irritable, moody, and not very optimistic (table: high degree of the dimension neuroticism) would rather slow down the progress of the Design Thinking team (table: extremely negative correlation). Thus, an extremely negative correlation is also found for neuroticism and the Design Thinking Capability *optimism*: An ideal Design Thinker is and stays optimistic in the Design Thinking process. Also, with regard to the Design Thinker Capability *eagerness to experiment*, optimistic and resistant persons tend to have the courage to experiment and no fear of failure. Unstable people are more likely to show less or no eagerness to experiment in the Design Thinking process (table: extremely negative correlation). In addition, a strongly negative correlation between neuroticism and *communication skills* as well as *curiosity*, both of which are necessary for Design Thinking, can be assumed. During the work in Design Thinking there are recurring phases in which constructive discussions take place - sensitive and delicate people can quickly reach their limits. Also, people with a high degree of this personality dimension are more likely to show less curiosity due to their emotional instability and inhibitions. However, *curiosity* is also an important personal capability of the ideal Design Thinker who is interested in other disciplines, topics and proposed solutions. All in all, it can be

concluded that the ideal Design Thinker tends to show low values and consequently a low level of the dimension neuroticism.

The entire analysis leads to the conclusion that ideal Design Thinkers show the following pattern with regard to the Big Five:

- *Low values in the dimension neuroticism*
- *High values in the dimension extraversion*
- *High values in the dimension openness to experience*
- *High values in the dimension agreeableness*
- *Average values in the dimension conscientiousness*

Therefore, it could be expected that students who achieve values in these directions would most closely resemble an ideal Design Thinker. Working in Design Thinking is likely to be less difficult for such students, as they are equipped with an extremely good starting point in terms of the expected Design Thinker Capabilities in carrying out the Design Challenge.

5   *Design-Implementation*: Testing the Big Five personality test and the developed Design Thinker Personality Profile in practice

To implement the personality test, the B5T (Paper Pencil Questionnaire) was converted into an online questionnaire using the SurveyMonkey (1999-2020) online survey tool. This conversion made the test more attractive for students and made it easier to evaluate the results later using Microsoft Excel. The SurveyMonkey online survey tool generated a link that directed students to the online personality questionnaire. Once students had completed the questionnaire, the results were stored in the online survey tool.

The link was sent by e-mail to all students who attended/are attending the seminar "Future Workshop" in the summer term 2019 (24 students in total), winter term 2019/ 2020 (21 students in total) and the current summer term 2020 (20 students in total). By participating in the personality test, the students simultaneously gave their consent to the use of their personal data for this research project. Because the personality profiles of the students are subsequently evaluated with the developed requirement profile of an ideal Design Thinker and the results are compared with the impressions of the lecturers in the design evaluation, a personal data collection was necessary. The age of the students was also recorded. Since the raw data of the Big Five Personality Test can only be converted into meaningful norm data (which relate the individual expression of a personality trait to the results of a comparison group), the norm tables were then sorted by age. The average age is 29 years (whereby students are between 22 and 42 years old).

The research sample consists of a total of N=37 students for the teaching profession at vocational schools at the University of Münster. All participants in this study are studying for the Master of Education. Of the 37 students, 26 female and 11 male students answered the personality questionnaire and agreed with the further research steps. In order to gain insights into the suitability of the personality test for diagnosing the expected Design Thinker Capabilities of the students when carrying out the Design Challenge in the seminar "Future Workshop", the research sample was drawn directly from the research field *seminar*. This method allows a later generalization of the results for this specific target group and thus a proposal for a solution to the problem underlying this work.

Once the total of 37 students completed the personality test in the form of the online personality questionnaire and the data was stored by SurveyMonkey, the next step incorporated the test evaluation. This was done by exporting students' saved responses to SurveyMonkey as an Excel

file, and then using the test scoring described in the test manual for that Excel file. In the end, by using and evaluating the personality test, an individual Big Five Personality Profile was available for each of the 37 students.

The next step was the actual testing of the intervention in a natural setting: Since the big five personality profiles of the 37 students are available, the individual personality profiles could be compared with the Design Thinker Personality Profile developed here. The closer a student's personality profile is to the Design Thinker Personality Profile, the better his or her personal starting point for Design Thinking. The defined norm value ranges of the Design Thinker Personality Profile could be compared with the achieved norm values of the individual scales of the students' Big Five personality profile. The number of matching scales was noted. For example, a student shows three matching scales (neuroticism, conscientiousness and agreeableness), who achieves the following norm values: 3 (low average) in neuroticism, 5 (average) in extraversion, 6 (upper average) in conscientiousness, 5 (average) in openness to experience and 6 (upper average) in agreeableness. The more scales that are in agreement, the more likely the student has an ideal Design Thinker Personality. The height of the corresponding scales indicates the degree of the Design Thinker Personality and thus, the Design Thinker Capabilities of the student:

- *Less than one matching scales = no Design Thinker Personality*
- *Two matching scales = not very close to the ideal Design Thinker Personality*
- *Three matching scales = average Design Thinker Personality*
- *Four matching scales = close to the ideal Design Thinker Personality*
- *Five matching scales = Ideal Design Thinker Personality*

The evaluation showed that a total of 8 % of the students have no or only one consistent scale and thus do not have a Design Thinker Personality. These students are not expected to have Design Thinker Capabilities and it is expected that they will have difficulties working in Design Thinking. In addition, 30 % of the students were found to have two matching scales. As such students are not very close to the ideal Design Thinker Personality, a rather low personal evaluation of Design Thinker Capabilities is also expected here. These students are unlikely to be very open to the Design Thinking process and will be critical of it. The average Design Thinker Personality is characterized by three corresponding scales, which applies to a total of 32 % of the students. Those students can adapt to work in Design Thinking, but are not ideal Design Thinkers, as they lack further Design Thinker Capabilities. Close to the ideal Design Thinker Personality, respectively to the Design Thinker Personality Profile, are 14 % of the students. This group has four corresponding scales and should therefore cope well with the Design Thinking approach. Working in the Design Thinking process will not cause them any difficulties, as they are equipped with almost all the necessary personal Design Thinker Capabilities. For 16 % of the students, an exact match with the Design Thinker Personality Profile can be found. These students can therefore be described as ideal Design Thinker Personalities. This means that all Design Thinker Capabilities can be expected, and these students will successfully complete the Design Thinking process.

6 *Design-Evaluation:* Comparison of the test results with the impressions of the lecturers

In order to verify the described evaluation and thus the designed diagnostic tool, further data must be collected from which conclusions can be drawn about the coherence and effectiveness of the intervention. For this reason, two lecturers who were active in the seminars "Future Workshop"

were independently interviewed about their subjective impressions of the students and their Design Thinker Capabilities. The students' data was collected on a personal basis, so the first and last names of each participant in the Big Five personality test are available. This ensured that the Design-Evaluation could take place in the form of a comparison with the impressions of the lecturers.

The mentioned behaviors, personality traits and conspicuous features related to the students in the Design Thinking process were recorded in writing in the form of key points. In a second step, the impressions of the lecturers were compared. The comparison showed that the impressions of the lecturers were basically the same. Therefore, the subjective impressions of both lecturers were summarized and recorded in the Excel file. At this point it should be mentioned that the recording of the subjective impressions of the lecturers had already taken place *before* the evaluation of the Design-Implementation, so that the recording of the subjective impressions was not unintentionally distorted. The results of the Design-Implementation were not available to either the lecturers or the researcher before the impressions were recorded, to rule out any possible influence.

In the evaluation of the comparison, it had to be taken into account that for 5 students of the summer term 2020, no comparison could be made because the lecturers of the seminar could not give any impressions. This is due to the fact that the seminar of the summer term 2020 took place as an online seminar in a virtual room because of the COVID-19 pandemic and that a reminder from the lecturers with regard to the behavior of the students was often more difficult and in the 5 cases in question not possible. This finding emphasizes the immense importance of a corresponding diagnostic tool for online learning, since the personal assessment of learners is often more difficult there than in classroom settings. Once these 5 students were deducted, i.e., a total of 32 students (instead of 37 students), a correspondingly higher agreement rate of 75 % (rather than 65 %) was shown between the results from the Design-Implementation and the impressions of the lecturers. A total of 4 students were assessed more negatively than expected utilizing the Design Thinker Personality of each student. For example, a student whose personality profile is close to the Design Thinker Personality Profile was only rated by the lecturers as a "midfield-personality" with regard to the work in Design Thinking. In contrast, the lecturers described a total of 4 students as having more positive impressions regarding the behavior and personality traits in the Design Thinking process than the comparison of the individual personality profiles with the Design Thinker Personality Profile showed. Accordingly, one student was described as "open-minded, interested, design-oriented and a team player" with regard to her behavior in the Design Thinking process, but who showed a personality profile that was only "a little close to the ideal Design Thinker Personality".

The examination of the data allows the statement that regarding the deviations of the impressions of the lecturers from the determination of the Design Thinker Personality, only term differences, but no age and gender differences are recognizable. For the winter term 2019/ 2020 only 1 deviation could be determined. On the other hand, for 3 students of the summer term 2019 and for a total of 4 students of the summer term 2020 there are deviations in the impressions of the lecturers.

7 Interpretation: Derivation of a *Design-Solution* or *Re-Design*

In the final phase of the DBR approach, the interpretation is carried out, which leads to a mature Design-Solution and theory development or demands a Re-Design of the intervention. In this case, the Design-Evaluation led to the conclusion that the Design-Draft, in combination with the B5T, is quite suitable as a tool to diagnose the expected Design Thinker Capabilities of the students. It

could be determined with some exceptions: The closer a student's individual personality profile is to the Design Thinker Personality Profile, the better the student is equipped with the necessary Design Thinker Capabilities for the Design Thinking process. The high agreement rates between the determined Design Thinker Personality of the students and the corresponding impressions of the lecturers showed that the expected success of each student in the Design Thinking process can be predicted correctly for the most part by determining the Design Thinker Personality. Only for 22 % of the students, the impressions of the lecturers turned out to be more positive or more negative than the determination of the Design Thinker Personality would have led to. These deviations were particularly noticeable among students of the summer term 2019, which was already some time ago, and the summer term 2020, which took place as an online seminar. For this reason, it can be assumed that the deviations are possibly due to the inaccurate recollections of the lecturers' respective impressions.

Consequently, the derived Design-Solution is very close to the Design-Draft, which has proven to be a valid tool for diagnosing the expected Design Thinker Capabilities of the students when performing the Design Challenge. By collecting the personality profiles of each student of the seminar "Future Workshop" using the B5T and the subsequent comparison with the developed Design Thinker Personality Profile (requirement profile), the Design Thinker Capabilities of the students can be predicted at the beginning of the seminar. In conclusion, this investigation reports that individual personality traits are very important for success in the Design Thinking process. It can be stated that equipping each individual student with personality traits conducive to the Design Thinking process strengthens the innovative power of the entire multidisciplinary team. Furthermore, a requirement profile could be designed to measure the personal qualification of a student by means of the requirement profile. During the empirical investigation of this work, the requirement profile called Design Thinker Personality Profile proved to be correct. Accordingly, the empirical investigation confirmed that the ideal Design Thinker shows the assumed pattern with regard to the Big Five. This pattern is illustrated in the following figure:
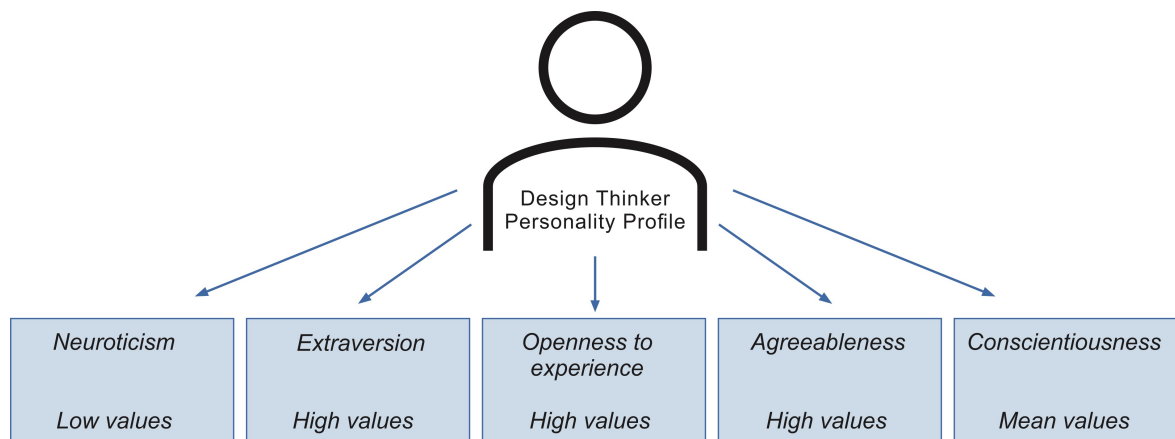

Figure 1. Ideal Design Thinking personality

The students, whose individual personality profile almost exactly corresponded to the Design Thinker Personality Profile, for the most part showed themselves to be more open, more able to work in a team and generally more successful in the Design Thinking process of the seminar "Future Workshop". The assumption that working in Design Thinking is less difficult for such students because they have good starting conditions regarding the necessary Design Thinker Capabilities could be confirmed by the empirical study. Accordingly, the Design Thinker Personality

Profile can be regarded as a model for an ideal Design Thinker and based on this, gradations can be made with regard to the expected Design Thinker Capabilities of a student. Within the framework of the research design, it could be shown that by comparing the individual personality profile of a student with the Design Thinker Personality Profile, an accurate prediction of the Design Thinker Personality of the student can be made. The developed intervention can fulfill some didactic functions to address the problem described at the beginning. Thus, through the design-oriented research, it has been possible to solve a complex problem in the teaching-learning context through an innovative, useful and practical intervention. In the following, it is briefly presented that the developed intervention a) helps in the composition of the teams, b) allows feedback to the students and c) can predict the individual support needs of the individual.

a) Composition of the teams: As a result of the developed intervention, the students can additionally be assigned to the teams according to their different personality profiles. In order to ensure that each multidisciplinary team is characterized by a high innovative power, it should be considered that each team contains students who are characterized by a good as well as a less good design thinker personality during team building. Lecturers should pay particular attention to ensuring that no team is composed of a relatively large number of students who are most likely to have difficulties with the Design Thinking approach and who have very few Design Thinker Capabilities. This would help to put the team members into a negative spiral and block the Design Thinking process. At best, every student whose personality profile is far from the optimal Design Thinker Personality Profile should be confronted with a personality profile of such a student in the team that corresponds to or at least is close to an ideal Design Thinker. In this way, the opposing attitudes towards Design Thinking as well as the missing Design Thinker Capabilities of the first student can be compensated.

b) Feedback to the students: In addition, the developed intervention makes it possible to consider the personality traits of each student regarding the expected Design Thinker Capabilities when working in the Design Thinking process. It is not only important for the lecturers to know the students' equipment with the personal capabilities necessary for the Design Thinking process, but also for the students. In this way, students are better able to reflect on their personal behavior in Design Thinking with regard to the behavior of an ideal Design Thinker. For this reason, the didactic intervention is intended to provide feedback to the students. On the one hand, this should show the students which Design Thinker Capabilities they already have, on the other hand, it should address deficits with regard to the necessary Design Thinker Capabilities that the students have to work on when performing in Design Thinking. The feedback can be provided in various ways. For example, oral feedback in the form of a short face-to-face conversation between the lecturer and students is conceivable. However, it is also possible to design a feedback sheet that shows the Design Thinker Personality of the student and highlights existing and missing personality traits for the work in Design Thinking.

c) Prognosis of the individual's need for support: In addition, the intervention can fulfil a further didactic function. The individual support needs of each student can be predicted. Already at the beginning of the seminar it is possible to identify the presumably weaker and stronger students in the seminar through the intervention. This is especially useful for online teaching since it is even more difficult to identify the personalities of the students when the seminars take place online in virtual rooms. Because most students are not personally known to the lecturers of the seminar and the work in the multidisciplinary teams is often not directly transparent for outsiders, the individual need for support could often be recognized too late

by the lecturers. At this point, the students had often already adopted a blocking attitude, as they found it extremely difficult to think and work in an open and free-spirited way and had lost their motivation. According to this, the intervention can support the lecturers of the seminar in their work to the extent that it is possible to predict the individual support needs of everyone at the beginning of the seminar.

8 Outlook and advanced research work

The conducted study shows that the individual personality traits of each student are important for success in Design Thinking and that thus the innovative power of the multidisciplinary team is based on the personality traits of each student. Furthermore, it can be hypothesized that the aptitude for the Design Thinking process can be measured using the developed requirement profile and the B5T. Due to the scope of the study, this work can only contribute to theory building regarding the relationship between the Big Five personality dimensions and the necessary Design Thinker Capabilities for Design Thinking work. The research is exploratory in nature and the results should not yet be generalized due to the small sample size. Therefore, it is necessary to validate and, if necessary, differentiate the results of this work via further studies and in other contexts.

Detached from the findings that still need to be validated, a transfer for own teaching practice nevertheless seemed promising. Thus, the implementation of a Test for the ideal Design Thinker Capabilities will benefit the lecturers of the seminar "Future Workshop" in order to enable the early detection of process-inhibiting personalities. For this purpose, it is used at the beginning of the seminar and feedback is given to the students along the test result, which shows them how they can optimally contribute to the Design Thinking process without influencing it destructively. A first corresponding experiment has been carried out, a second one is being planned. However, an evaluation of the didactic intervention based on following the test is still pending.

From a management perspective, it seems obvious to us to use the test to identify promising Design Thinking personalities in order to form promising design thinking teams from a positive selection. However, this other-subjects area usage perspective raises fundamental questions: Does the composition of a team exclusively from ideal Design Thinker personalities actually generate a better result, or does a composition of personalities that are as complementary as possible bring an advantage to the team? Doesn't the optimizing type of composition of a Design Thinking team even collide with the concept of multidisciplinary teams? Thus, interesting transfer possibilities and exciting research questions for the diagnostics of Design Thinker personalities with the B5T also emerge in other contexts.

Acknowledgement

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