DESIGN THINKING, TEACHER PROFESSIONALISATION AND INNOVATION OF EDUCATION: A GOOD MATCH?

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Abstract

In this study we investigated if applying the design thinking approach in teacher professionalization interventions was suitable for developing skills related to educational quality and innovation. In addition we investigated how teachers experienced the design thinking approach. 20 participants from different faculties with diverse expertise and backgrounds took part in an educational innovation program which used the design thinking approach.. Data was collected via a questionnaire prior to the start of the program and via a questionnaire and a group interview after the program finished. Skills related to educational quality and innovation were measured by using various questionnaires. The pre- and post-survey was completed by 15 participants. The group interview was attended by 17 participants. Overall, it seemed that the design thinking approach can be successfully implemented in selected teacher professionalization interventions as it supported the development of various skills related to educational quality and innovation. Especially skills like innovative behavior, empathy and creativity. Generally, design thinking offered teachers a broad toolkit for solving complex problems. Although sceptic at the start, teachers regarded working together in a team, thinking outside the box and taking the end-user as the starting point as very important facilitators and benefits. Some factors were considered as hindering i.e. the time intensive nature of the method and keeping the overview during the whole process. Overall however, teachers indicated that the benefits outweighed the experienced hindering factors. In conclusion, design thinking seems a powerful professionalization-approach to develop an innovative and creative way of thinking that stimulates sustainable development and innovation in education.

Keywords: teachers, Design Thinking, professionalization, innovation, educational quality, skills, end-user, development

1 INTRODUCTION

The quality of the teacher is essential when it comes to striving for and ensuring good quality of education [1];[2];[3]. A good teacher disposes of skills in the areas of ICT literacy, critical thinking, creativity, problem-solving, collaboration and communication. Also, knowledge of one's own cognitive functioning (metacognition) and the ability to direct one's own learning (self-directed learning) [4] are typical skills a good teacher disposes of. As teachers are increasingly seen as "agents of change" who play a major role in educational innovation [5];[6] skills like adaptability, empathy and problem-solving are also considered as very important [7];[4]. Teacher professionalization activities can contribute to the (further) development of these skills. Teacher professionalization consists of goal-oriented interventions that promote the quality of teachers [8] and is particularly effective if active learning can take place, the professionalization process is spread out over a longer period of time, and if there is coherence with one's own teaching practice [9];[10].

A method that may be very suitable to instigate the (further) development of abovementioned skills is the design thinking methodology. Design thinking is a human-centered approach to solving complex problems and innovate based on user needs and desires [11]. Its principles are increasingly being applied in the educational context to help students (learners) develop skills needed to function in today's rapidly changing digital society [12];[13]. These skills include, but are not limited to, problem-solving, creativity, empathy, and innovative thinking [14] and correspond to skills important for teachers to develop in the context of educational innovation and educational quality [6]; [4]. In addition, a design thinking approach meets the aforementioned characteristics of effective teacher professionalization: active learning over a longer period of time, linked to one's own teaching practice.

Based on the theory as described before it is likely that implementing a design thinking approach into teacher professionalization programs may lead to the development of valuable skills related to educational quality as well as educational innovation. To explore this, we designed a teacher professionalization intervention in which teachers worked on innovating their own education using the design thinking methodology. The following research questions guided our practice-based research study:

1. Is the use of a design thinking approach in teacher professionalization interventions suitable for developing skills related to educational quality and innovation?
2. What facilitating or hindering factors are experienced by teachers?
3. What benefits are experienced by teachers?

2 METHODOLOGY

A total of 20 participants from different faculties with diverse expertise and backgrounds took part in an online educational innovation program which used the design thinking approach (15 women, 5 men). The program ran from September 2020 until March 2021 and consisted of 10 sessions. The first two sessions covered a full day; The meetings thereafter were split into three hours each. Between the sessions, homework assignments were carried out, such as interviewing end users, developing ideas from the brainstorm or asking for feedback on an idea. The project was concluded with a focus group meeting and presentation of the results. During these months the participants worked in multidisciplinary teams of 4 on (re) designing a course following the design thinking methodology. During the course of the program the teams were reshuffled several times. The whole process was guided by two facilitators who were design thinking and innovation experts in education and business. Data was collected via a questionnaire prior to the start of the program and via a questionnaire and a group interview after the program. Skills related to educational quality and innovation were measured by using various questionnaires (see table 1). 15 participants completed both the pre- and post-survey and 17 participants attended the group interview.

Table 1. Overview of constructs and questionnaires

Construct	# items	Likert scale	Source
Innovative thinking	14	6-point	[15]
Uncertainty	9	5-point	[16]
Empathy	4	5-point	[17]
Team work	4	5-point	[17]
Interpersonal behavior	7	5-point	[16]
Learning orientation	5	5-point	[17]
Curiosity	3	5-point	[17]
Critical thinking	4	5-point	[18]
Creativity	5	5-point	[16]

3 RESULTS

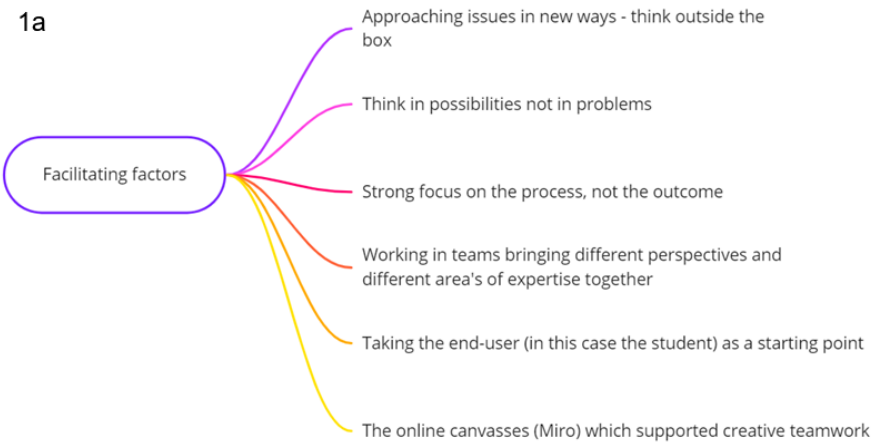
Table 2 gives an overview of the development of the skills related to educational quality and innovation during the 6-month teacher professionalization intervention. The mean scores of all measured skills increased with the exception of curiosity. ‘Innovative behaviour’ and ‘empathy’ substantially increased. In addition, self-scored creativity increased impressively over time. Curiosity however decreased (over 50% of the teachers assessed ‘curiosity’ lower after the intervention).

Table 2. Average score participants and total on constructs (N=20)

Participants	Construct																	
	Innovative behaviour		Dealing with uncertainty		Empathy		Working in teams		Interpersonal relationships		Learning orientation		Critical thinking		Curiosity		Creativity	
	Pre	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*	*Pre*	*Post*
P1	4.3	5.0	3.6	4.5	4.0	4.3	4.5	4.0	4.0	4.3	4.0	4.6	3.5	4.0	4.0	4.3	3.6	4.5
P2	3.9	4.5	3.3	4.8	4.5	4.5	4.8	4.5	4.3	4.3	4.4	4.2	3.8	4.3	4.0	4.3	3.4	4.8
P3	4.6	5.5	3.7	3.8	3.8	3.8	3.8	3.8	3.6	3.9	3.8	4.2	3.8	3.8	4.0	3.7	3.4	4.5
P4	4.9	4.0	3.6	3.8	4.0	3.8	3.8	4.0	4.0	4.0	4.0	4.2	3.8	4.0	4.0	3.7	3.6	4.3
P5	2.6	3.1	3.0	3.5	3.5	3.5	3.5	3.5	3.4	3.9	3.2	3.8	3.5	3.8	3.0	2.7	2.8	3.8
P6	3.4	3.2	3.1	3.8	3.3	4.0	3.8	3.3	3.7	4.0	3.6	3.8	4.0	4.0	3.7	3.2	4.0	5.0
P7	3.4	3.5	3.8	3.3	3.5	5.0	3.3	3.5	3.9	4.3	4.0	4.0	3.0	3.0	4.0	4.3	2.4	4.0
P8	3.4	3.4	3.0	3.3	3.5	3.5	3.3	3.5	3.7	3.3	3.8	3.6	3.8	4.0	3.3	3.3	3.2	4.0
P9	3.4	3.8	3.2	4.0	3.5	3.5	4.0	3.5	3.0	3.9	3.6	3.8	3.0	3.8	3.0	3.3	3.0	5.5
P10	5.6	5.1	3.8	4.5	4.5	4.0	4.5	4.5	4.1	4.0	4.6	4.6	4.5	4.3	5.0	4.3	4.8	5.8
P11	3.3	4.4	3.2	4.5	4.3	2.8	4.5	4.3	3.9	3.6	4.2	4.2	4.0	4.3	4.3	3.7	3.6	4.8
P12	4.4	4.8	2.9	3.3	4.0	4.0	3.3	4.0	4.1	4.0	4.0	4.0	4.3	4.0	4.0	4.0	4.0	5.0
P13	4.8	5.1	3.1	3.8	3.8	4.3	3.8	3.8	4.0	4.0	4.0	4.0	4.3	4.0	4.3	4.0	4.0	5.3
P14	4.0	4.5	3.4	3.3	3.8	5.0	3.3	3.8	4.4	4.3	4.8	4.6	4.0	3.8	3.3	4.0	3.6	4.5
P15	4.6	5.1	3.2	3.8	3.8	3.8	3.8	3.8	3.7	3.9	4.0	4.4	4.8	4.5	4.3	3.7	3.4	5.3
Mean score	4.0	4.3	3.3	3.4	3.7	4.0	4.0	4.0	3.9	4.0	4.0	4.1	3.9	4.0	3.9	3.7	3.5	4.7

Note: green squares indicate an increase of the respective skill, red squares indicate a decrease of the respective skill

Teachers indicated that they experienced both facilitating and hindering factors (see Fig. 1). Facilitating factors according to the teachers were being triggered to think outside the box, being encouraged to see things from different perspectives due to working of people with different backgrounds and expertise, taking the perspective of the end-user (student in this case) as a starting point. Hindering factors teachers experienced were the lack of overview and in some cases direction, the considerable time investment and changes in group composition during the runtime of the intervention.



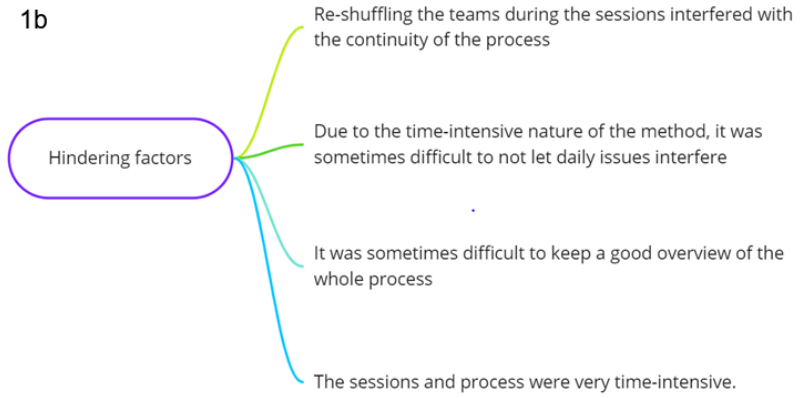


Figure 1a+b. Facilitating and hindering factors of the Design thinking approach

At the start teachers were a somewhat sceptic about the design thinking approach. Over time they experienced the benefits and the added value (Table 4). The biggest insight - also mentioned as a facilitator – was that solving problems WITH the end-user and not FOR a student leads to better results. Also the notion that short iterations can lead to big results and that big steps not necessarily lead to good results was supported by most teachers. Overall, teachers agreed that the design thinking method provided tools and approaches that were very suitable to solving problems and creating better insight into student centered improvements as well as improvements of the organization.

Table 3. Benefits experienced by teachers

General benefits mentioned by teachers
Thinking WITH the end-user, not FOR the end-user
Constant focus on the goal
Broader perspective due to investigating trends and involving stakeholders
Unexpected outcomes
Benefits for teachers own professionalization
Insight in one's own creativity and ability to innovate
The notion that big steps do not always lead to the best results
The notion that short iterations lead can lead to fast results
Benefits for educational innovation
Concrete tool/method for teachers to put students at the core of educational
A different approach to solving complex problems and thinking of innovative solutions
Awareness of the fact that the end-user is very important in educational design
The approach helps to understanding the bigger picture

4 CONCLUSIONS

Overall, it seems that the design thinking approach can be successfully implemented in selected teacher professionalization interventions as it supports the development of various skills that enhance educational quality and innovation. This supports the findings by Henriksen et al. [14] and Lukacs and Galluzo [6]. and answers our first research question in the affirmative. Especially skills like innovative behavior, empathy and creativity increased according to self-report of the teachers. However, the results show that curiosity declined during the process. An explanation may be that the teachers

initially overestimated their curiosity yet, during the design thinking process which partly thrives on the curiosity of its participants, readjusted their opinion about their own curiosity. It may have become clear to them that they were not as curious as they initially thought they were.

Generally, design thinking offered teachers a broad toolkit for solving complex problems. Using the design thinking methodology automatically means that the potential solution fits the wishes and needs of the end user, as they are the starting point of the trajectory as well as included in the rest of the process. In answer to our second and third research question regarding respectively facilitating and hindering factors and benefits of the design thinking method, taking the end-user as the starting point was regarded as a very important facilitator as well as benefit and resulted in the biggest learning improvement experienced by teachers involved in the training.

Furthermore, although sceptic at the start, teachers experienced working together in a multidisciplinary team and thinking outside the box, the essence of innovation, as facilitating. In the context of this teamwork, the fact that teams were reshuffled during the process was regarded as a hindering factor. Teachers saw a strong added value in staying together during the process and build on previous sessions as a team.

Based on research indicating that teacher professionalization spread over a longer time is generally found more effective [9];[10], our trajectory was spread over 6 months to maximize the effect. However, teachers indicated that they found the process too lengthy. For future teacher professionalization interventions including design thinking, it would be interesting to investigate the right balance between the length of the trajectory and the achievement of good results. Especially as the teachers experienced that short iterations can lead to big results, which was one of the benefits according to the teachers.

In conclusion, design thinking seems a powerful professionalization-approach for developing an innovative and creative way of thinking that stimulates and supports development and innovation in education.

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