

Reflecting design learning in collaborative development - towards integrative teaching practices in Finnish teacher education

Concepts of design and designing are usually connected with industrial design and crafts. Recently, however, design learning has appeared in educational contexts with varying definitions. At present there is a discussion of design going on in Finland, because the capital, Helsinki, is the World Design Capital for the year 2012.

In this article, we explore the concept of design learning and discuss how it might be implemented in pre-service teacher education. The study makes use of the methods of the Developmental Work Research by Yrjö Engeström in its collaborative development of teaching practices. As part of our innovative developmental work process, teacher educators in multidisciplinary subjects and primary student teachers were asked about the needs for new approaches in teaching. According to our surveys, there is a need to reorganize teaching practices in teacher education.

Discussion based on our study led us to collaborative development work. As the result of our reflections, a theoretical approach to the collaborative learning environment was outlined by the theories of social creativity, integration, and design learning. The development work of different thought-provoking means of teaching encouraged not only us, but also our student teachers to develop their teaching to a level that corresponds to the needs of modern society.

Introduction

Presently there is live discussion of design and design learning going on in Finland, because the capital, Helsinki, is the World Design Capital for the year 2012. As well, there is discussion on what design might mean in educational context. For example, in order to respond by its part to the discussion of design in the Design Capital Year, the University of Helsinki has [expanded](#) the concept of design to social innovations to mean human ways of solving problems through education and research. Conventionally, the concept of design is connected with industrial design and crafts. Moreover, often design articles are created by a team which gives a possibility to utilize various individual expertise. In this study, our interest is in what the concept of design learning might offer Finnish education .

In an educational context the concept of design learning seems to signify immaterial designing (non-productive in the sense that a process is not followed to bring any material object) and is connected with the planning of learning situations as effective pedagogical practice (such as learning about design and designers' ways to work, and learning creative thinking), organizing study programmes (designs for learning), or organizing learning spaces and environments. There seem to be some basic elements in the conventional design process (such as fulfilling a public need, using of collaborative creativity and sharing of individuals' expertise) that could be more

accurately utilized in Finnish teacher education.

In this article, we discuss the ways design learning could improve Finnish interdisciplinary teaching and learning. There are education, theories and research based on design learning (e.g. Seitamaa-Hakkarainen, 2008; Cow, 2012; Bequette, 2012) and design thinking (such as conducted by D.School, Cultural Landscapes Collaboratories, Cicero Learning and IDEO). As David Kelley, founder of IDEO, expresses the basic aim of developing design thinking in people lays in a methodology that allows people to “have confidence in their creative ability” and allow individuals to participate, communicate and innovate (Kelley by von Zastrow, 2010).

Our aim is to represent an integrative viewpoint for implementing class teacher education by unifying knowledge acquisition over separate subjects, and which responds to future challenges and students’ needs. Theoretically, this approach is based on creative thinking, collaborative learning, social creativity, and the integration of different subjects. We will begin to outline our idea of a shared, collaborative development process and follow by focusing on the concept of design learning and design thinking.

As the result of our developmental process, we will present a pedagogical framework for realizing integrated, collaborative learning and teaching in Finnish teacher education. According to the research literature, teachers’ motivation is correlated with students’ learning results (Chawla, 1998; Palmer, 2005). Therefore, we pay attention to development of teachers’ work in teacher training, which hopefully has consequences later on to our students.

Research problems

The main goal of the study is to apply the concept of design learning and explore how it could be connected with Finnish teacher education. Finnish teacher education is deeply based on separation of different school subjects taught by subject teachers. Thus, we are interested in searching for diverse teaching and learning approaches that would integrate different subjects and exploit active learning methods.

The research problems are the following:

1. How does one define the concept of design learning in education?
2. What kinds of teaching and learning activities form the basis for an integrative learning process?
3. The collaborative work development process as a starting point

In pre-service teacher education in Finnish universities all school subjects are taught separately (Rantala et al., 2010). Although integration and multidisciplinary are relevant pedagogical aspects, teachers tend to think and teach in a very subject-orientated way. The idea for this shared development process begun with the observation: Why we, teacher educators, are not more efficiently making use of the collaborative capital among us, and how could we act as transformers to develop a more dynamic teaching-learning culture in our institutions? This seems to be a common problem in Finnish Teacher Education. In our recent survey (Karppinen et al., 2012b) we asked all multidisciplinary teachers in Finnish teacher training institutions about integration and collaborative teaching. The results indicate that over time several trials has been made, but they were incidental by their nature and outcomes were not satisfactory. On one hand, most of the

teachers who had long teaching experience (more than 20 years) were disappointed with their trials. On the other hand teachers with less experience (less than 5 years) seemed to be eager to use integrative teaching methods, but longed for some guidance from their senior colleagues.

The integrative teaching and learning require experience from both teachers and students. In our other recent survey (Karppinen et al., 2012a) to our student teachers about their perceptions of integrative and collaborative teaching and learning, the results indicate uncertainty to use this kind of approach in their teaching. No wonder, because it requires new way of thinking (cf. Sawyer, 2006; Kelley by von Zastrow, 2010) and willingness to step into an undetermined area. Student teachers' were asked about perceptions of collaborative learning and social creativity, the need for integrative and collaborative teaching methods, and the possible advantages of collaborative teaching and learning.

The large majority of respondents (97%, 31/32) either completely or partially agreed that there is a need to apply new comprehensive and creative approaches in integrative teaching. Moreover, the majority of class teacher students wanted more training in how to take into account social creativity as part of teaching.

During the development of our process, we found that the work we are doing is, in fact, one very concrete answer to Lonka and Pyhältö's (2010) dream for future Finnish teacher education, where teachers would have lifelong abilities to transform, think creatively, and learn to observe things from different angles. We, authors group of art and science teachers, decided to be open to the process and allow it to generate many different aspects of this theme. Our collaborative work development process seemed to motivate us, bringing joy and enthusiasm to our work, which was a significant outcome that reminded us of the unused potential in our organization. This is also a key issue from the standpoint of lifelong managing and enjoying the work. (see Figure 1).

Our experience indicates what Engeström (2001, 137) has stated about learning in work organizations: people and organizations are always learning something that is not stable, not even well defined or understood ahead of time (as we tend to believe, based on standard theories of learning). He continues (ibid. 138): "In important transformations of our organizational practices, we must learn new forms of activity which are not yet there. They are literally learned as they are being created." The following figure presents an applied process of developmental work based on Yrjö Engeström's studies (1995, 1999).

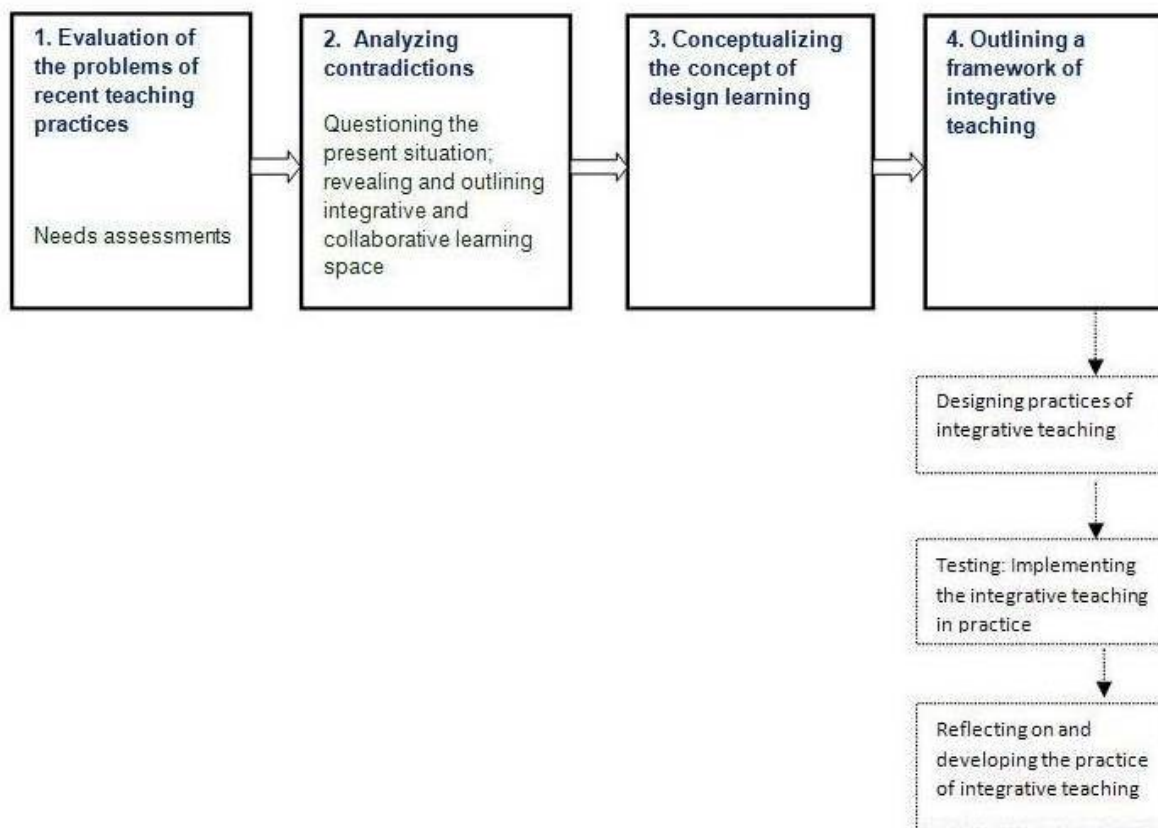


Figure1. Negotiation process: Expansion of teaching

Our development work can be defined as a negotiation process. Through negotiation, the structure, curriculum, and content (in the teacher education programme) as well as the different areas of our specialties were reconsidered. The process was similar to what Dave Cormier (2008, 3-4; see also Lemke, 2008; Gutierrez, 2011) describes as the ‘community as curriculum’: “Curriculum is not driven by predefined inputs from experts; it is constructed and negotiated in real time by the contributions of those engaged in the learning process.

This community acts as the curriculum, spontaneously shaping, constructing, and reconstructing itself and the subject of its learning”. Cormier calls his model ‘rhizomatic education’; a rhizome is something living, flexible, connectible, reversible, modifiable, having multiple entries and exits. Both Engeström’s and Cormier’s ideas of shared knowledge within an expert community and of unstable, living developmental processes led us to consider a new framework for Finnish teacher education.

In the following sections, we will discuss theories of design learning, social creativity and integration by outlining the structure of collaborative and active learning and grounding the framework of design learning in Finnish teacher education.

Design Learning

Design and designing (product drafting, developing, and innovative creation) are concepts that are habitually connected with industrial design, crafts, architecture, interior design, fashion (Haute couture), or graphic media. Conventional design is tightly linked to consuming and commercial purposes and is produced by a manufacturer. Frequently design articles are created by a team. Design typically indicates high quality and represents a highly valued product or production, which satisfies the demands of the public for certain functions and situations. Where the concept of design indicates more or less a product, there designing and design learning direct to thinking. Design learning is a concept that is used in educational contexts in a meaning of collaborative planning and creating. (e.g. Seitamaa-Hakkarainen, 2008; Wang, 2010; Gow, 2012; Bequette, 2012).

Design learning seems to be a complex concept, one that has recently been used in different fields, from education, organizational management, and leadership development to customer services, marketing, and information and communication technologies (ICT). In these contexts design indicates par excellence immaterial planning and reorganization, but it also suggests the planning of new learning spaces. According to some current research, extending the formal use of ICT and new devices to learning can be as profitable as breaking up the traditional models of teaching (e.g. Richards, 2005; Scardamalia & Bereiter, 1994; Lanter-Johnson, 2010; Yang et al, 2011; Cow, 2012; Bequette, 2012). Utilization of mobile and other new devices and social media in education suggests new possibilities and challenges for integrating ICT into education in a way that effectively connects the specific contents of a curriculum with the various elements of the learning process (Richards, 2005; Cow, 2012). It seems that the new digital devices and social media have appropriated the concept of design learning (learning by design), as they can offer attractive equipment and opportunities for new ways of teaching and learning.

However, design may offer a fruitful basis for other educational settings as well, such as learning by design, which involves a person or a group creating an item at the same time as they conduct the planning process (as in games, textiles, robots, interactive machines, prototypes). In groups, individuals show different skills and talents, which enable multifaceted observations and the perception of details (Lehrer, Erickson, & Connell, 1994; Hedrich, 2011).

However, our aim by the suggested application of design learning is not only creation and designing of unique articles. As well, the aim is not only based on the use of new technology but, in general, developing diverse integrative learning method for integrative thinking. That is, to offer individuals effective learning experiences so that students stay engaged and discovers new meanings and connections over subject areas through different tasks. It aims at immaterial and experimental thinking and building up collective knowledge. This is, what David Kelley calls design thinking "where you put together ideas from different sources - it's synthesis" (von Zastrow 2010).

Recent applications of design learning and design thinking seem to be related to certain learning traditions (such as discovery learning, collaborative learning, integrated learning, and problem-based learning). We were interested in creating and reflecting upon a dynamic emerging learning space that would join collaborative, active, and discovery learning, socially shared knowledge, and creativity, while also unifying different school subjects. The teaching method in progress suggests the need for teachers to approach this challenge more as 'designers' of effective and integrated learning rather than as simple 'transmitters' of knowledge about certain subjects (e.g. Richards,

2005).

In this context, it is required teaching activity that is diversified, multi-sensory, and multifaceted. Diversified teaching integrates several school subjects and gives pupils the opportunity to explore tasks with all of their senses and to gain knowledge in a way that activates their curiosity, inspiration and creative thinking. Our approach of the teaching-learning space is compared to the concept of design thinking introduced by David Kelley where design thinking is described as experimental and less step-by-step, an intuitive process. Design thinking enables students to go beyond whatever it is that the teachers want to teach as well as learning basic skills. (von Zastrow 2010.)

In this study, we define the concept of design learning as design thinking meaning integrative and collaborative knowledge acquisition. In our swiftly changing world in which of lifelong learning abilities are required there is a need for the kind of approach wherein students and pupils may acquire the ability to transform, think creatively, and learn to observe things from different angles (cf. Lonka & Pyhältö, 2010). The ability of integrative thinking is, according to our opinions, as important as skills in math, science and mother tongue, as Kelley also has stated. The following section outlines the integrative thinking by theories of collaborative, integrative and socially shared knowledge.

Social creativity and integration in educational contexts

For thirty years ago in scientific theories of creativity the focus was on the myth of individual genius. At the same time, that tendency was also common in design thinking, and articles designed by individuals had great prestige (cf. [IDEO's designs for learning](#)). That is to say, in quite near past, the main expression was that communities, societies, and organisations flatten individuals' thinking by their similarities and normalization. Postmodern thinking challenged those ideas, and today the mainstream discussion is on the terms of social creativity. In particular, the rapid growth and flood of information have shown that no one can manage or be creative alone. Instead, we should move from "individual" to "community".

This feature has been successfully appropriated within design learning and design thinking, where collaborative creativity and teamwork are favoured nowadays. One of our hypotheses is that in a group, the individual can be released from the prison of the self and diversify working methods, habits, and beliefs (cf. Csikszentmihaly, 1997, 23). According to the systematic theories of social creativity, it is important to see creativity as a result of the interactive process of communal factors and individuals. Vygotsky (1978) emphasizes that learning takes place first in social situations, such as discussions, and later becomes internalised on the individual plane (Vygotsky, 1978, 57). As well, as Mihaly Csikszentmihaly (1997) argues that: ". . . creativity does not happen inside people's heads, but in the interaction between a person's thoughts and socio-cultural context. It is a systemic rather than an individual phenomenon." (Csikszentmihaly, 1997, 23.)

The terms of creativity have been one of the most important questions in education in Finland and worldwide (Uusikylä & Piirto, 1999; Gardner, 1993; 2006). Art subjects especially have been understood as developing human creativity (Gardner 1993; 2006). However, there is a continuous

struggle in curricula between creative and structured teaching.

One way resolve this problem has been illustrated by Keith Sawyer (2004; 2006), who discusses scripted (structured) and creative teaching. According to Sawyer, traditional scripted teaching is too heavily based on instructionism, where knowledge is only a collection of static facts and procedures, which teachers should put into students' heads. This type of school, which is still common today, was designed during the first half of the twentieth century as an answer to the challenges of the industrial economy. (Sawyer, 2006, 1.) Creative teaching instead aims for deeper conceptual understanding by preparing students to create new knowledge. The teacher's role is more to facilitate than to teach in a traditional way. The curriculum of creative teaching consists of non-static facts, which are integrated into contextualized knowledge from culture. Creative learning is built on both the teacher's and the learner's prior knowledge and this constructivism leads to a classroom founded on collaborative conversations.

The creative element of constructivist learning is based on the fact that classroom conversations are improvisational. This means that the teacher and the students build knowledge together within the theoretical frameworks in which unexpected insights emerge (Sawyer, 2004; 2006; von Zastrow 2010). This is also our aim in our work-in-progress for the collaborative and integrative learning space. These dimensions by Sawyer show that creative teaching is suitable for the postmodern knowledge society (see also Lonka & Pyhältö, 2010; von Zastrow, 2010).

Improvisation and spontaneity in teaching cannot be done in a laissez-faire manner, but should be well planned. It is important to design a general framework that allows the learners to make observations freely and comment on them as spontaneously as possible. This means that the teacher should be able to react to the students' suggestions and ideas that deal with unexpected questions and problems that arise. According to Sawyer, improvisation can lead to a deeper understanding if it is disciplined by theoretical background frameworks.

This means that when improvisational teaching occurs "within broad structures and framework it can cause the most effective classroom interaction which balances structure and script with flexibility and improvisation." (Sawyer, 2004, 13.) We are searching for just this kind of spontaneity in our framework for learning. Sawyer's arguments emerged from the theories of neo-Piagetian social constructivists and Vygotskian-inspired socio-culturalists. The focus of both is on how knowledge is learned in and by groups. In both theories "effective teaching must be improvisational, because if the classroom is scripted and directed by the teacher, the students cannot co-construct their own knowledge." (ibid., 14.)

Sawyer's thoughts about larger background frameworks raise the question of integration. In an educational context, integration has many dimensions. It can be focused on the whole school, the curriculum, or the learning process. It can be vertical, creating connections between different phenomena in one subject, or it can be horizontal, connecting different subjects round the same theme or school subject. (Salonen, 1989, 1-7.) Within teacher education integration is initially understood as combining the subject contents into larger unities (Niemi, 1991, 74).

In our work the primary goal of integration is to obtain connections between different subjects so that students can discern the surrounding life more comprehensively (cf. Niemi, 2012) and, as Sawyer would say, develop deeper understanding. Our focus of integration is on the learning process and on horizontal integration, but vertical experiments are also possible. There should always be a concrete meaning for integration. Here the integration creates a basis for an open

learning space by synthesizing different learning entities and put together ideas from different sources, as in Kelley's design thinking. Its wider meaning is to expand the possibilities of teaching and learning, and finally, also may reveal joy of teachers and students in teaching and learning.

The framework of integrative teaching

As a result of our work development process among teachers in teacher education, a perspective for integrative teaching and learning was created. It offers a framework for a collaborative learning environment. It was developed by authors in order to respond to the needs of Finnish teacher educators and students for integrative and collaborative teaching methods.

The aim of the integrative teaching is to unify different knowledge over the subject areas according to a well-planned design. The process is based on socially shared knowledge, integrative thinking, social creativity, and collaboration among students and teachers (e.g. Sawyer, 2006; Kumpulainen et al., 2010). That means that teaching and learning are based on social activities in which interaction and communication are essential (cf. Kelley's philosophy in IDEO). It has been shown that human beings learn best in interaction (e.g. Sawyer, 2006). Working in a group and sharing 'know-how' have certain advantages, which cannot be obtained in the individual learning process. Collaborative working and learning are formed through interaction and reciprocal action (Kauppila, 2007, 151). That means that students mirror their thoughts and reflect on their ideas with other students and eventually consolidate their own thinking. Meanwhile, this activity enables a heuristic approach over the subjects' area, and joins ideas from different sources.

In this flexible process the teacher is not a "transmitter" of knowledge, but a facilitator or mentor who guides the process and creates possibilities for the students to explore new topics. In the best cases the process increases confidence in creativity, as Kelley states (von Zastrow, 2010), increases the joy of learning, and encourages participants collaboratively to step into an undetermined area. The framework is an example of how to promote teamwork among teachers and students, and share knowledge and expertise.

Conclusions

In the study, our effort has been to discuss and reflect on collaborative and integrative teaching practices in Finnish teacher education through the theoretical development work process. The process of redefining the concept of design learning has produced a range of ideas and the motivation to find new methods in teacher education. The concept of design learning is understood in the study as integrative thinking and collaborative knowledge acquisition.

In our rapidly-changing society and given the swift advances in technology, there is a continuous need to develop teaching and learning methods, as well as the skills of teachers to respond to these needs. The framework of integrative teaching is one example of how to respond to current demands of the society and teacher education (cf. Niemi 2012; Lonka & Pyhältö 2010). The framework is a theoretical approach and still requires implementation in practice. The practical example of the integrative teaching is in progress.

The next step will be to implement the model in teacher education and finally to test it in a school

context. In a school context this kind of teaching method where pupils could become better acquainted with each other may in the best cases also have other positive advantages in addition to improving of thinking skills, for example, against bullying and social exclusion. However, the mainstream of the future seems to lie in social activity and socially shared knowledge.

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