

Material and surface - Course synergy as a channel towards a more encompassing view of learning

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The course Material and Surface is a combination of four minor courses: Experiential Textile Design, Dyeing, Textile Printing and Embroidery. The course combination is offered to first-year textile teacher students. Through combining courses, the aim has been to support integrated learning and transform fragmented education into a thematically coherent whole. The four courses form an intertwined and progressive structure in which each course is based on the knowledge learned from the previous course. The creative basis of the Experiential Textile Design course applies David Kolb's theory (1984). The creative ideas are then applied to assignments in Dyeing, Textile Printing and Embroidery. Following the courses, students collect assignments in a learning portfolio. They organize their assignments in a progressive order to self-assess personal development, the creative process and changes in learning and thinking.

The aims of this research were to find out 1) how the course combination reinforced students' understanding of their own learning, 2) in which ways students' own experiences strengthened their personal development and 3) what effect the collaboration had on teachers and their working. Data collected during the years 2008–2013 consisted of students' portfolios (N=152), teachers' self-reflections as notes and diary remarks and notes from the final critiques. Data were analyzed using qualitative content analysis.

The results indicate that the learning portfolio serves as feedback for the teachers. During the courses, the students worked in groups and shared experiences which strengthened collective values and meanings. Mutual sharing built the group's cohesion, which was observable in students' vivid and increasing discussions: they shared more of their ideas, they encouraged and inspired each other. Diversity appeared to be the most important feature that arose from the data – all experiences were evaluated equally true and valuable.

Keywords: textile teacher education, integration, synergy, curriculum

Introduction

The society surrounding school system raise challenges for teacher education: Education should respond to the needs of employers and working life. The new National Core Curricula for compulsory basic education (2016) in Finland emphasize collaborative classroom practices in multi-disciplinary and phenomenon- and project-based studies where several teachers work together with a group of students. Traditional school subjects will continue, but distinct borders are breaking, and more collaboration between subjects will be implemented (Halinen, 2015; see also Drake & Burns, 2004). It seems that the habit of working in the conventional way with a subject-based focus in lessons is strong. On the other hand students tend to continue their learned ways of teaching and guiding when they begin working life as teachers. Thus, teacher education has vast opportunities when offering tools to students for creating new knowledge, raising enthusiasm and introducing innovative ideas. (Räisänen, 2014.) Co-teaching and -learning practices are best implemented when they are self-discovered and learned in an early stage of studies.

Textile teacher education

Textile teacher education at the University of Helsinki educates students to teach in compulsory school as well as the adult education sector. Moreover, graduates can work as specialists in a variety of duties in the field of textiles. The degree of Master in Education, 300 credit units (cu), consists of 30 cu of general and freely selected studies, 60 cu of Teacher pedagogical studies, 60 cu of Minor subject studies and 150 cu of Craft studies in which students are introduced to different craft techniques, and they acquire the skills to apply the techniques later in their own work and teaching.

About 30 new students, age from 20 to 40 years old, are accepted to the education annually. Students have different backgrounds: some may have no previous education in design, and some may have completed other courses or even have a degree in design and textile production or fashion design.

The course Material and Surface (8 cu) is offered in the first year of studies during the spring semester. Students from both major and minor studies of craft participate, a total of approximately 40 participants every year. The course is a combination of four minor courses: Experiential Textile Design (2 cu), Dyeing (1.5 cu), Textile Printing (1.5 cu) and Embroidery (3 cu). The courses form an intertwined and progressive structure in which one course is based on the knowledge gained from the previous courses, and together they produce a continuum in which the resulting ideas are produced as personal materials which can be utilized to produce textile artefacts (Figure 1). However, the aim in the Material and Surface course is to concentrate on working with the materials and techniques and not to think about the possible end product. The creative basis is built in the Experiential Textile Design course. Students complete assignments through which they learn different ways of gathering information and expressing ideas. This knowledge is applied and deepened in the assignments in the Dyeing, Textile Printing and Embroidery courses.

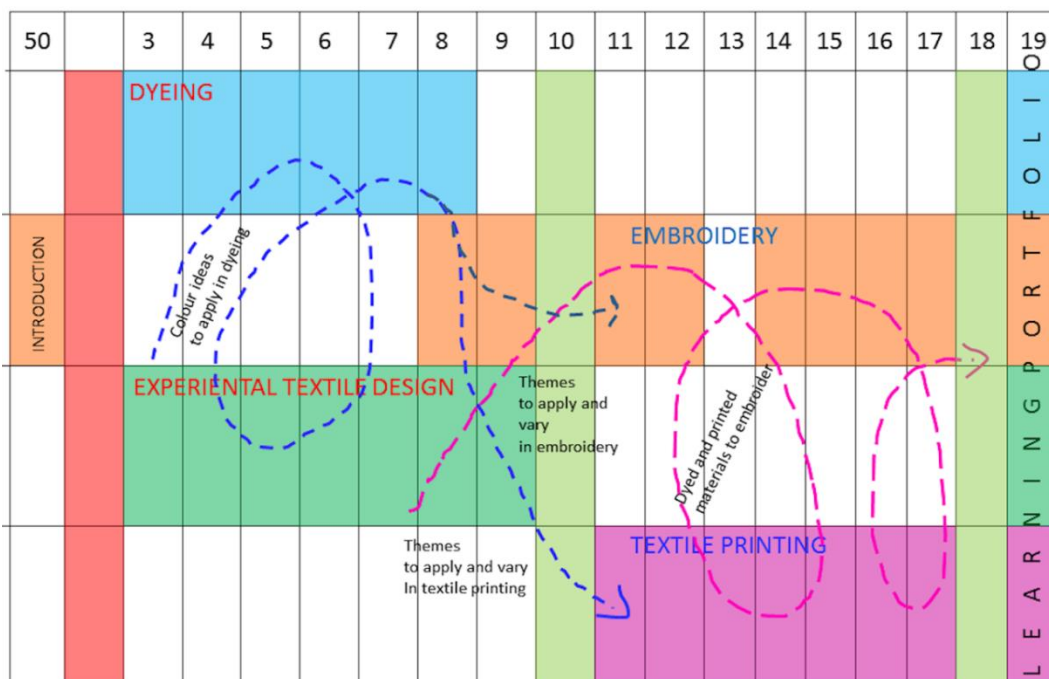


Figure 1: Material and surface - developing synergy through courses.

The Material and surface course started in 2006. The course description and contents of the courses have remained relatively unchanged over the years. However, numerous changes have been implemented as

a result of the experience gained in each of the combined courses. There have been teacher changes, reduction of contact teaching hours and increase in independent work. In addition the courses have been located in different ways along the periods: either compactly within a short period of time or less compactly within a longer period of time. As a result the rhythm of the courses and the assignments have varied. Thus it has been important to develop the content of each assignment to serve the course combination in the best possible way.

Creativity and learning

Creative ideas are seldom invented easily. According to Lawson (2006), a long-standing debate is ongoing on whether people are born creative or if creativity can be taught. But as several researchers have shown, creativity and problem solving can be taught in many ways (e.g. Cross, 2007; 2011). However, students with no prior exposure to design often have difficulties generating ideas. Having the conviction necessary to present one's own thoughts is often especially challenging. This generally stems from the student's own internal limitations, which can include feelings of shyness and shame towards his/her own ideas, but can also be ignorance of the needs of others. Therefore, thinking arising from one's own life and experience is often seen as a supportive factor in design. As Dorst (2006) notes, personal goals have a strong motivational aspect – designers become attached to their projects. This approach develops and strengthens the self-image of the student (Pöllänen, 2006).

The American psychologist and educator David Kolb's experiential learning theory was chosen as the background theory. Kolb's theory is a perspective on learning that combines experience, perception, cognition and behaviour. Holistic thinking is the main characteristic of Kolb's learning cycle (Kolb, 1984; Räsänen, 1997). The theory provides an effective means to participate actively in self-development through transformative learning (Räsänen, 1997).

As learning is a cyclic process, in experiential learning theory concrete experiences combine with abstract concepts. The learning process forms an expanding spiral, which has also been described as a cycle (Kolb, 1984; Räsänen, 1997). With this, Kolb aims to combine past and expected experiences and obtain new experiences that will deepen or renew the previous ones. As an educational tool, the cycle helps to increase students' understanding of the process of learning from experience as well as of their unique individual approach to learning. By increasing awareness of how they learn, the aim is to increase learners' capacity for metacognitive control of their learning process, enabling them to monitor and select learning approaches that work best for them in different learning situations. By providing a language for talking about learning styles and the learning process, students and teachers can also discuss how to create the most effective learning environment (Kolb & Kolb, 2005).

According to Kolb and Kolb (2005), learning can be conceived as a process, not in terms of outcomes. Learning is best facilitated by a process that draws out students' beliefs and ideas about a topic so that they can be examined, tested and integrated with new, more refined ideas.

Narrative inquiry revolves around an interest in life experiences as narrated by those who live them. Narrative theorists define narrative as meaning making through the shaping or ordering of experience, which is a way of understanding one's own or another's actions. Narrative is organizing events and objects into a meaningful whole. It is connecting and seeing the consequences of actions and events over time (Chase, 2011). Narrative inquiry is not just retrospective meaning making, or the shaping or ordering of past experience, but it also takes into account future aspirations. In addition, narrative does not mean only spoken and written words, but can include pictures and experiments. In the Material and

Surface course, art-based working is a method for accessing multiple ways of understanding human experiences, senses and emotions (see Finley, 2011).

In craft education, direct sensory experiences are the basis for artistic–aesthetic action. Art-based approaches invoke beyond-text sensations employed to assess sensory phenomena, which are highly meaningful in that they are ineffable and invisible compared to conventional text-based methods. Arts provide access to qualities of life that literal language has no great power to disclose (Prosser, 2011; also Sava & Nuutinen, 2003).

From these starting points, craft design projects place the student in relation to other people and what is happening in the world. Sometimes these projects encourage students to engage in a certain type of craftivism where craft and making is a small-scale statement (also Garber, 2013). Parker (2010) has studied women’s place in cultural history by analyzing embroidery from the Middle Ages until now. She has shown not only the femininity in embroidering but also its radicalness. In these projects, the starting point and viewpoint encompass world phenomena and collective thinking from the creator’s own life story.

Holroyd and Shercliff (2014) have shown that making with others has a long history in textiles. They have examined working with textile craft groups as a research method in hand-knitting and hand-stitching groups. Since crafting together has a long history, more effort should be put towards teachers working together intertwining their knowledge instead of solo teaching.

Research aims, materials and methods

The research aims were to investigate

- 1) how the course combination reinforced students’ understanding of their own learning and
- 2) in which ways students’ own experiences strengthened personal development.

The aim was also to find out

- 3) what effect the collaboration had on teachers and their working.

Data were collected during the years 2008–2013 and consisted of students’ portfolios (N=152), teachers’ (N=3) self-reflections which were notes and diary remarks, and notes from the final critiques held at the end of the each course combination (5 x 1.5 h). In the final critiques notes were written down online with computer so that everyone present could see and comment on them immediately.

The research material was analyzed using data-based qualitative content analysis. Narrative research can be considered as a research method, but in this inquiry it was understood as a phenomenon under the study. The emphasis was on the subjective story where the focus laid on students’ or teachers’ own experiences. Following categories were used for the content analysis: discomfort, challenges, opportunities, achievements and skills for the future.

The Material and Surface course

In the Material and Surface course, students learn the principles of dyeing, textile printing and embroidery techniques, and they explore the circumstances, raw materials, tools, auxiliary substances, chemicals and working requirements for these crafts. The students are given the opportunity to utilize the materials that they have prepared and the techniques learned in other courses as well, such as courses on clothing, interior textiles and knitting.

The goal of the teachers is to help the students to learn how to transform their thoughts and experiments into their own individual textiles and artefacts. Because the students will become teachers themselves, the main point is to encourage them to generate ideas on how to use dyeing, printing and embroidery in teaching with students of different ages, and on planning subject-integrated learning projects.

Experiential Textile Design

In the Experiential Textile Design course, students become familiar with the comprehensive, multi-material problem-solving process of designing materials and surfaces. Students gain a basic understanding of how inspiration can be drawn from within. They learn to acquire knowledge independently, develop ideas and apply them experimentally in the other courses. Students practice documenting their ideation, design and manufacturing processes, as well as reflect on their working and learning.

Brainstorming done with mind mapping starts the design process. In mind mapping ideas are organized into a rhizome-like order instead of lists, for example, into French lines. It is a flexible tool to clarify thoughts, obtain an overview of seemingly separate pieces of information and to organize issues or make connections not evident beforehand.

Students are guided through a three-step mind mapping process where they collect memories, experiences, events and turning points from their life. Next students add details into them and finally they examine them with all their senses: vision, hearing, touch, smell, taste. The more notes are made on the mind map, the better chance there is for innovative, workable new ideas to emerge.

Students select three themes from the mind map for making three collages. Each collage must have a different theme directing its colours, materials, shapes and forms. Further, each collage should be different in its visual aspect, size and shape. Each collage must also have a name or a title. Naming helps the student to find words for embryonic ideas.

The mind map process often produces ideas about potential collages. However, students may overlook these ideas because they do not have the information or experience of the many techniques to make them. Thus, the teacher must guide the students in the exploration of materials and techniques. During this assignment, students become familiar with numerous techniques for making collages.

The names may also include inspiration for colours and motifs and/or for materials and their properties. Often names give collages a link to times, places and people, which can begin a spontaneous sharing of ideas with classmates.

Collages are the basis for conducting experiments in the spirit of them. Students are asked to develop a minimum of five experiments for each collage. Carrying out these experiments entails the free, unusual or absurd manipulation of the materials, which need not be textiles. One of these must be an ugly experiment.

In this phase students should defer any critical judgment of their ideas and carry out open-minded experimentations with all kinds of materials and material combinations. In addition, they are not expected to manufacture any products or prototypes. Instead, students must remain at an experimental level, developing ideas in new ways, leaving an unfinished idea to be developed later, or even leaving it unfinished, if a new interesting idea comes to mind.

The experimentation phase ends with guided sketching (cf. croquis). Students change sketching styles at five-minute intervals (e.g. geometric, ethnic, conversational, animal, retro or vintage, electronic style) and examine how different styles and artistic tools shape the ideas further. The goal is not to dwell on one figure “forever”, but instead to keep the process open to changes and surprises.

All works done in Experiential Textile Design are collected into an intermediate portfolio. Students compose an essay in which they reflect on their working process as well as their views on learning and design styles in the light of Kolb’s learning theory. Despite its name, the intermediate portfolio should not be a binder or similar, but a unique "package" reflecting the essence of the themes of the student’s mind map.

The contents of the intermediate portfolio often have three temporal dimensions. There is yesterday: memories and stories from childhood, home and growth. These past dimensions are easy to approach, they can raise many visual points of view, and they can also be re-interpreted in many new ways. There is today: the here-and-now, a fresh perspective on current events. These present dimensions may be confusing as they often raise questions but contain no answers. Then there is tomorrow: hopes, dreams and reflections on future life, work and income, love, family and one’s own home.

Dyeing

The aim of the Dyeing course is to introduce the students to synthetic dyes and their dyeing techniques. Powder and liquid types of dyes are used to dye synthetic and natural fibres, yarns and fabrics. In the beginning and to discover the basis of colour theory, dyes and dyeing are discussed from the viewpoint of chemistry and physics. After that, students are introduced to a list of eight different experiments that they carry out working in pairs or small groups. For each dyeing experiment, students select a target colour from the colour themes created in the Experiential Textile Design course or from their personal colour charts. The students mix colours according to these target colours. Thus, the dyeing is not a random and mysterious process but a task accomplished according to planned ideas. Students need to generate ideas on how to use dyeing as a tool to express their own creativity. Through dyeing, the students can make patterns and express themselves through colours.

The first exercise is to dye the basic colours, warm and cold hues of yellow, red and blue, with reactive dyes in powder form. Different material structures are used to demonstrate how the weave affects the observed colour. Each pair of students takes one dye to use to create this pure tone. By using just one dye it is easier to learn the dyeing technique and its phases. No dyes are mixed yet.

The course has seven other exercises which the students may accomplish in any order they wish. In these experiments students mix dyes to obtain colours. The exercises are 1) shibori, which is resist or tie dyeing, 2) ikat dyeing, 3) bleaching with chlorite or slide dyeing as optional techniques, 4) dyeing wool with a hot dyeing method using acid dyes, 5) dyeing wool fibres for felting with reactive dyes using a cool dyeing method, 6) dyeing two hues from their personal colour chart using a Linitest

laboratory scale dyeing machine, and 7) dyeing a greater amount of material in a washing machine according to a Linitest sample.

Textile Printing

In the Textile Printing course, students are first introduced to the basic techniques and terminology of hand-printed textiles, hand-printing tools and chemicals, and then to the process of creating designs for hand-printed fabrics. Students learn the direct printing method, the use of water-based pigment colours and the silkscreen technique. Students work together independently with their self-developed design briefs.

The course has six assignments. Half of them focus on concrete textile printing, and half on printed textile design. All the design ideas for the assignments are chosen from the intermediate portfolio. The ideas are not “frozen”; instead, they can be further developed in accordance with the printing technique, the fabric used or the pattern requirements.

First, the students paint a personal colour chart. With this assignment, they deepen their knowledge of colour theory, become familiar with printing chemicals, learn to mix pigment colours and learn to translate the colour story from Experiential Textile Design into textile printing. Then students gain practical experience in fabric printing by using easy, fast and temporary silk screen printing techniques (open screen, masking tape pattern and stencil cut from paper). The final assignment in textile printing is done with an exposed screen patterned with the student's original design motif.

The second half of the assignments focus on printed textile design. Students learn to create their own unique design motifs and produce variations on the motif with the assignments of pattern layout, colour family and pattern family. The term pattern layout means how the motifs are repeated across the width and length of the fabric in a continuous manner. Through pattern layout, students learn the principles of developing surface patterns. Colour family means a set of printed fabrics whose colours have a common factor. In this assignment, students create multi-coloured variations for one pattern layout chosen from the previous assignment. The students' own colour chart assists in the colour investigations. A pattern family means a set of fabrics that have a common factor in their patterning. This assignment helps students to consider how a variety of patterns can be developed and coordinated together in different ways.

During the last lesson of the Textile Printing course, the students present their course work: sketches, printed fabrics, test swatches and even failed exercises. Students can see each other's entire processes, beginning from the choices made in the Experiential Textile Design course. Figure 2 shows the link between the design inspiration and the printed textiles. The joint discussion of the idea development, the creative discoveries made outside the course, for example in the Embroidery course, the aha! moments and difficulties encountered, and the solutions found give students a broader understanding of their learning and working.

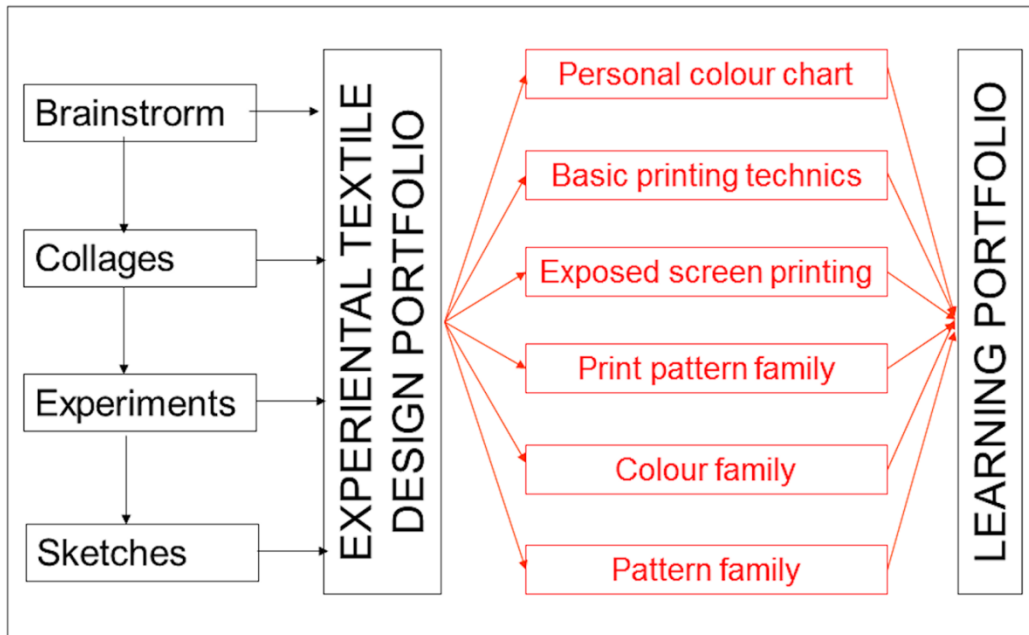


Figure 2: The link between the design inspiration and the printed textiles.

This last lesson is not an evaluative, but a reflective conversation where the students together examine their learning experiences. Also important in this lesson is that the students consider how to apply these lessons learned to different teaching needs. The discussion paves the way for actual reflection, which is included in the learning portfolio.

Embroidery

The basic aim of the Embroidery course is to introduce the principles of embroidery techniques, fabric and yarn materials, tools and contemporary guiding materials. The focus is mostly on embroidery worked by machine. Stitching by hand is less used. At the beginning, students learn the guidelines of the history of embroidery, and they are introduced to what embroidery could be in modern times. The embroidery course starts with a deep look at the ideas that the students have generated in the Experiential Textile Design course. They discuss their thoughts and ideas, and everyone selects one main idea from their intermediate portfolio to continue it through embroidery.

Every assignment should be ready, or almost ready, before the student starts with the following assignment. This is because students need to explain what they have done and why they have chosen those materials, colours and visual aspects. This is how they learn to analyse and explain their own and others' work; they also see many different ways to approach the same technique, and in this way they enhance their knowledge of embroidery. Questions are discussed such as why some of the exercises look beautiful or interesting, or why one embroidery product seems to represent its maker and why another does not. Sharing ideas is very important. The main goal is to learn how to transform one's thoughts and experiments into individual embroidery.

The selected embroidery techniques vary year by year, but basic techniques are always included: basic stitches, application and reverse application, quilting, machine embroidery and machine darning, as well as patch painting. For example, students learn first how to make perfect stitches, such as the chain stitch, the French knot and the fly stitch. Then they are encouraged to do those stitches differently, for example, to make them very loose or tight or to do enormous or tiny stitches and to vary the colours, materials and the thickness of the thread. They may choose colours from their personal colour chart and motif, or an idea of a motif from the contents of their intermediate portfolio (Figure 3). When analysing these assignments, students may discuss possible meanings for these kind of stitches. All the material that the students have produced during the Experiential Textile Design, Dyeing and Textile Printing courses are crucial for the embroidery. The number of assignments varies from eight to ten.



Figure 3: An assignment to vary learnt stitches to express their feelings.

The themes of the students' embroidered works, gathered during the data collecting years, can be divided into three groups: storytelling, experimenting and the social history of embroidery. Storytelling was popular and fascinated students during the years 2008–2010. Because the Embroidery course is offered to first-year students, they often address themes such as relocation to the big capital city of Helsinki; their – perhaps sudden – independence; or the unwritten pressure to be everything: student, girlfriend/wife, mother and daughter.

When the students embroider in experimental ways, the collages and essays are extremely important. Students need to accomplish many assignments, and they apply the visual ideas quite strictly from the Experiential Textile Design. These assignments are like embroidered sketches. Here, the basis lies in the visual approach. This may be very evocative, or it can shed light on the differences in embroidery methods and techniques.

Recently, a new interest in material-based art and hand-crafting techniques has emerged in craft and contemporary art. Embroidery has gained new relevance. Embroidered contemporary artefacts relate both to the social history of embroidery and to the nature of the medium itself, which is both an activity and a process. According to Parker (2010), embroidery is a naturally revolutionary art. Parker's findings have been one examination subject in these embroidery courses. It also has been inspiring to juxtapose the peaceful and quiet making of old Finnish embroidery textiles and current embroideries. In these design projects, concepts such as materiality, tradition, gender, time and memory have actualized. This category is named social history and the life of embroidery.

The learning portfolio

At the very end of the Material and Surface course, every student prepare a learning portfolio. The learning portfolio is a collection of exercises that the student has gathered during the entire Material and Surface course. The goal is to guide the student to observe and actively assess his/her personal development, creative process and changes in learning and thinking, and to identify what skills still require development.

An essential part of the portfolio is the reflective writing on and analysis of the changes in the student's learning and thinking. Some students also ponder how they would teach these subjects in the future. Reflective observation and evaluation is not easy. It must first be learned and then actively practiced. When students write down their thoughts regularly, they learn to understand the importance of reflection for themselves. However, they need to be guided to write their reflections on a regular basis.

The learning portfolio can be confused with the basic portfolio and the professional portfolio. The first is mostly used as a storage for all their work, and the latter presents their selected best work. The learning portfolio instead is a tool to enhance reflective thinking and learning skills. The learning portfolio requires students to stop looking only at their processes. It requires them to review their own learning, the development of their increased know-how and the quality of their work. In their self-evaluation, students locate, identify and examine their strengths and the development they still require.

Results and discussion

According to the analysis the Material and Surface course has the following goals: to support learning from a subject-based orientation and transform fragmented education into a thematically coherent whole; to reinforce students' understanding of an entire textile designing and producing process; to help students to gain new insights and avoid fixation on one topic or idea; to help students to understand their own learning; and to strengthen student's personal identity and the group's identity. The students represent many nationalities, religions and ages. When working together, supranational experiences meet, and a collective language is found.

The stories that students write, tell and modify into experiments during the courses are a way for them to study their experiences, to cherish their memories or to wipe them away. Narrativity is a path to self-understanding. Acts of narration reveal how experiences, events and knowledge come together to generate meaning - for oneself and for an audience. The ability to understand other people grows out of one's capability to understand oneself (Saarnivaara, 2003). Students may choose difficult episodes from their life to address during the course. Teachers or fellow students should not serve as therapists, although students quite often find the course to be a therapeutic experience.

I felt relieved to think through my father's passing, which I haven't mourned enough. Through my material and subject choices and during the hand embroidering I felt like I had my own privacy to commemorate and handle my sorrow.

Discomfort

For some students, the first part of the Material and Surface course is demanding. The design brief for Experiential Textile Design is deliberately posed as an open-ended, in some cases even wicked, problem (see Rittel & Webber, 1973). The openness follows the principles of experiential learning theory: it is

learner directed, flexible for individual possibilities and develops learners' knowledge, skills and emotions via experience.

The open-ended design assignment may seem too large and embryonic, and managing it is challenging. At this point students are encouraged and supported in facing uncertainty. During the course they learn to divide the assignments into manageable parts. When students find the constraints of the design problem on their own, they have an opportunity to gain a deeper understanding of how sources of inspiration can be used both in personal and educational contexts.

At the beginning of Experiential Textile Design, the free [open-ended] exercises were frustrating. It made me also nervous that I have to use all that "stuff". But later I realized that I can trust in a meaningless, stupid idea and use it for the course tasks.

Some students have uncomfortable feelings about the crafting experiments when no specific expectations are set for the results or goals. When feeling uncertain, they may either approach the assignment in too narrow a way or they may rush to do "whatever" in order to finish the task. Conflict, differences and disagreement are needed to drive the learning process. Conflict means an internal uncertainty, a dissonance between one's desires and abilities, but it is also a source of motivation. Conflict can be seen as a temporary chaos able to motivate learning because it illuminates areas of misunderstanding. Conflict cannot be viewed only negatively, because it can enhance learning. Thus, the course balances conflict with safety and encourages students to learn from their mistakes (Socha, Razmov & Davis, 2003).

What kind of weird experiments?! I thought that we would be making concrete designs for all the courses.

The development of ideas may arouse fear. Quite often the reason may come from professional designers whose skills give a false picture of the design process. (Laamanen & Seitamaa-Hakkarainen, 2014a; 2014b.) Another reason may come from the practices of industrial textile and clothing design, where ideas from the outside world are used as a source of stimulation for personal interpretation and expression, and where the focus is on the final manufactured results. Less attention is paid to the work done behind the scenes, in the designer's creative process (Koskennurmi-Sivonen, 2014). Personal fears and images of professional designs may lead to a fixation on the working process and its speed and quality.

Students may have fixated on routine ways of ideating and making, for example, on iteration. While iteration at its best can help one to improve an idea, it can also limit one to refining that idea indefinitely. Students may have fixated on the ideas that first come to mind (see Laamanen & Seitamaa-Hakkarainen, 2014a; 2014b). Students may also have fixated on a brief where problem solving begins with a given phenomenon. An emphasis on external information can turn students' attention away from their internal resources. If craft teachers utilize ready-made designs or ways of working, students never have the opportunity to develop and learn to improve them. The Material and Surface course offers endless possibilities to explore ideas more thoroughly instead of fixating on potential solutions.

I understood that my own design carries my life story. It is a secret that only I know.

During the courses, students are given plenty of freedom, but also responsibility. When students can choose themselves how to solve a problem, they tend to be uncreative and focus on solutions that worked best in the past. Freedom can hinder creativity, and constraints can promote creativity. By using

constraints, reliable responses are precluded, and novel surprising ones are encouraged (Laamanen & Seitamaa-Hakkarainen, 2014b). Although experimentation was emphasized in teaching, also thorough understanding of the basic techniques were stressed. After students have adopted the many techniques, they can start to combine and develop their own making to its potential.

At some point every year, students begin to discuss the adequacy of time. Some do not have enough time to finish the assignments, and the workload feels too heavy in relation to the length of the course (two seven-week periods, 8 cu i.e. 216 hours). Students feel that the lack of time hinders their ability to handle all the new information, and many feel frustrated: *the pace kills my creativity*. Thus, it is important to discuss one's individual sense of time, the need for time and habits of spending time.

In general, students agree that the intertwining of the courses is a good thing and that it stimulates new ideas about how to combine materials and techniques in ways that they would have not thought of on their own (Figure 4). Furthermore, the fast pace of work produce unique and original ideas because there is no time for criticism. The intertwining of the courses enhances learning to a level at which the learning is not only about the technique but also the development of the idea and the story behind the experiment.

Experimentation became a very familiar concept throughout all the courses. We did a lot of technical experiments in every course, and we also combined them with each other.

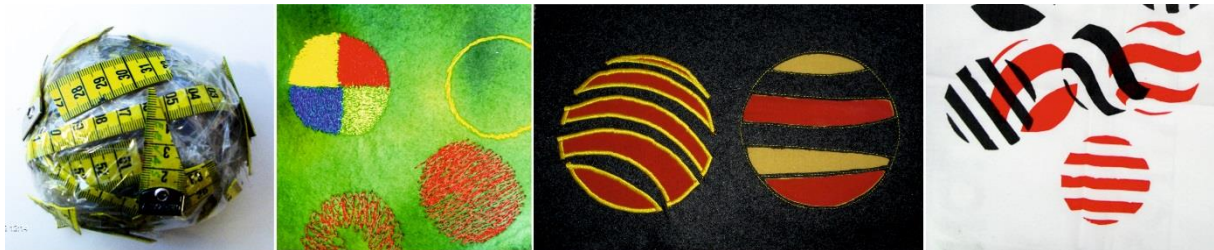


Figure 4. The intertwining of the courses stimulates new ideas about how to combine materials and techniques.

Although teachers prefer working in a group, some students ask for permission to do the assignments at home, or elsewhere out of the classroom, where they can work on their own, be alone or be silent - and feel safe. However, the number of students who make the designs and do their assignments at home decrease every year.

It was found important for the students to be close to each other in the same or adjoining rooms when they worked with their own or shared projects. When working within a group, varied applications and advanced techniques can be learned by watching others, even though the student himself/herself is dyeing, printing or embroidering an item for the first time in his/her life. When students can see each other working, they get ideas and share experiences. Students are also encouraged to help each other to solve problems if the teacher is busy with another student. This introduces them to learning to apply their knowledge both in the craft subject and teaching. Furthermore, students' shared experiences give importance to collective values and meanings. On one hand, the focus is on strengthening students' personal development through sharing experiences. On the other hand, the mutual sharing builds the group's identity and cohesion. What is important is diversity – all experiences are equally true and valuable.

Students are assigned to work with materials, structures, surfaces and expression. This work is expected to generate new possibilities that are unpredictable intellectually. They cannot produce intellectually if they consider too deeply; instead they must experiment and accept accidental coincidences. It is tempting for the students to try to solve design problems by deduction, i.e. by looking at some cause-and-effect relationships in the design assignment or in the observations from outside. The creative processes of the Material and Surface course include no definite requirement to solve design tasks. The main premise is to find interesting design problems.

Challenges

During the Material and Surface course, words change into pictures, collages, experiments and assignments. This does not happen very easily because students do not know how to transfer ideas from one course to another or from one craft technique to another. For example, after the Experiential Textile Design, Dyeing and Printing courses, with their many material and technique exercises, students find it quite difficult to start embroidery. They have somewhat traditional feelings about embroidery requiring perfectly done stitches and a picture-like finish. Thus, questions such as what happens during translation from one language into another have been discussed. Similarly, Sava and Nuutinen (2003) describe a dialogue between words and pictures, between the researcher's and the artist's processes.

The transition between courses has revealed some other challenges as well. For example, the students become tired of their themes and want to abandon them. They also would like to produce an artefact for their own use, and they reject otherwise good ideas. If these aspects are pointed out, students think that their design ideas are "frozen" and have difficulties developing them. Students sometimes do not recognize the connection between the courses and the idea of continuity, and they approach each course as a new beginning.

The students are challenged to take an active role in their own learning as well as their designing. Some students are accustomed to receiving assignments from the teacher, who has defined the constraints of the task and who also guides the implementation. The Material and Surface course contains many parallel lines, which cause anxiety to students. For some of them, too many topics have a negative impact on learning. This is taken into account through the reflection activities, which help to deepen learning.

The teacher must explain precisely at the beginning of the course, what and how clear the final results should be.

The learning portfolio always raises much controversy about the additional objectives and requirements set by the students. The students have noticed internal pressure to compete with regard to the quality of the portfolio. This competition may mean a great investment of time, money and human resources. Every year the portfolio requirements are discussed together, but it is not easy for a student to turn his/her attention away from the peers. Therefore, students are encouraged to compete only with themselves.

I realize that I have done The Portfolio.

The students have the desire to begin to prepare material for their future work as a craft teacher. One reason for this desire is the new National Core Curricula, where the contents of subjects are being refined, and the students are aware of the need for appropriate teaching and learning material.

After this course, the portfolio is useless because I cannot use it as teaching material.

Opportunities

The Material and Surface course emphasises the students' own, active self-expressive process, and teachers act in an assisting and facilitating role. One big question that is asked every year is how to support the students' self-assessment. It is admittedly challenging to assess a course starting with an open-ended design problem, which is further modified in the assignments of other courses. How can a common set of principles be created that can be explained to the students before the start of the course? This kind of session would be an opportunity to understand the students' evaluation criteria and their creation and development.

Another question deals with the cooperation between teachers. Students comment that cooperation between the teachers is not smooth or that it does not exist at all. In their opinion, the teachers' different views on matters relating to the courses or assignments is a negative thing. Instead, the different views provide students with opportunities to expand their thinking, to change their perceptions and to learn something new. In addition, this is an opportunity for students to see multi-professional cooperation, which they may also encounter in their working life.

The perception may be due to the students' expectations of the dominant role of the teacher. In the Material and Surface course, the teacher's role is to guide and encourage students in their personal learning and working processes. It is understandably not easy to change deep-rooted teacher-led learning habits and embrace a learner-centred approach.

Achievements

The Material and Surface course familiarizes students with the interrelation of materials and their manipulation techniques. Unusual working techniques such as tearing, scratching, breaking, burning, folding, gluing and fastening are explored. The aim is to understand the possibilities of manual experimentation, spontaneous invention and discovery. Also important are students' opportunities to make observations about materials and their "will": one material is easily manipulated, a second is somewhat easy to handle, but the third may be very reluctant. Some materials do not "surrender" to the students' will, but let the students listen to what they hint at becoming.

The Material and Surface course offers opportunities to make mistakes and to see mistakes as opportunities. It is believed that mistakes enhance deeper learning, and the greatest innovations in the world have mostly been unplanned mistakes. Through a mistake, the ugly is given a role and starts to become beautiful (Figure 5). The application of aesthetic composition principles is not a requirement; instead, students can follow their own likes and dislikes.



Figure 5: The ugly becomes beautiful: The color trial swatch from textile printing is the foundation for embroidery.

I want to make beautiful, nice and finished products. Making beautiful products gives pleasure and satisfaction, and it is motivating.

The discussion of ugliness aims to help students to identify their own style. But when discussing ugliness, they often discuss taste and what is meant by taste in craft. Along with this topic, a discussion often begins on whether something is prohibited, boundary breaking or even taboo in craft. The discussion frequently leads to either the qualities of craft (i.e. the burden of history, look and faultlessness) and its materials (i.e. the feel or pleasantness of the material, colour and technique) and meanings (e.g. modesty, social suitability and fashion), or the personal, even private choices of the craftsman. Although students are encouraged to generate creative solutions without the fear of being ridiculed, discussions on the fear of failure still often arise.

It would be nice to know in advance what we will do during the course in order to do something nice and nothing ugly.

There are always thoughts such as “*Am I doing it the right way?*”, “*What does the teacher expect?*” and “*How this will be evaluated?*” (see also Laamanen & Seitamaa-Hakkarainen, 2014b).

I would have liked to refine the ideas and to learn to do things right. It is more comfortable to go on in terms of technique than in terms of themes.

Skills for the future

Both the existing and the future elementary school core curricula focus on the entire craft process. They emphasize a variety of design premises, multisensory experiences and observation, and the analyses of objects in the built and natural environment. In addition, documenting the different phases of the handicraft process is also emphasized. These diverse points require a teacher to become familiar with the design process and its constraints (Laamanen & Seitamaa-Hakkarainen, 2014a). In the Material and

Surface course, students develop ideas and create design tasks that engage with their own lives. Thus, the course offers opportunities to look at the ideas explored in it more thoroughly instead of fixating on potential solutions.

In addition, the course provides knowledge and support for the future teachers on how to teach design. According to previous studies, there is a need for design education for teachers. Teachers are the key personnel at schools, and they need support and ideas on how to discover new ways of teaching and planning curricula. Learning by sharing is an empowering experience that has long-lasting consequences on both personal and professional levels.

In the teacher education context, students are challenged to construct their identities as future textile teachers (Collanus, Kairavuori & Rusanen, 2012). During this course, some students may not learn much about designing, but instead they engage in analysing their identity throughout the process.

In the autumn I had the idea that in order to be a good teacher, private life and identity must be forgotten.

Understanding his/her own identity helps a teacher to strengthen the identity of others. Craft as self-expression is a way to learn sensitivity to various cultural phenomena and cultural conventions, as well as to better understand and accept cultural differences (Pöllänen, 2011). Students should be helped to understand different cultural identities, since pupils might represent many nationalities, religions and ages.

Conclusions

The aims of this research were to find out how the course combination reinforced students' understanding of their own learning and in which ways students' own experiences strengthened their personal development.

The Material and Surface course, similarly to crafts in general, develop a person's creative and cognitive processes, such as his/her planning skills and problem-solving ability, as well as his/ her organisation and evaluation of the work.

It was discovered that students become more able to observe their surroundings from a new perspective. They also develop a sympathetic habit of challenging the teachers. Eventually, the need to complete assignments becomes a virtuous circle: students start to like working impulsively, even though it is sometimes difficult for them to take the first step. But very often their effort becomes a flow, and it is hard for them to stop working or inventing new ideas and things.

This study showed that when working together students learn by watching, and that helping others is great practice for their future careers as teachers. For many, these group work lessons without a teacher are important.

On the teacher point of view the aim was to find out what effect the collaboration had on teachers and their working. The learning portfolio is a feedback channel for the teachers. Since the Material and Surface course is not a "one size fits all" course, the portfolio is an opportunity for the teachers to reflect on their own working methods: what they expected students to learn, what they actually learned, and what they still needed to learn. In addition, each teacher in the Material and Surface course had a history of solo teaching. Thus, teaching together as a group required learning and adaptation. Cooperation strengthen also the teachers' personal development, group identity and cohesiveness.

In the forthcoming (2016) Master's degree requirements, the Material and Surface course will contain the previously explained four combined courses as well as Weaving. Thus, the total number of credit units will increase to 10. The timing of the Material and Surface course has been expanded to the entire study year of four seven-week periods (10 cu eq. 270 hours). This change is a response to the students' criticism of the tight schedule of two seven-week periods. In addition, it was felt that weaving is a natural part of the Material and Surface course and that the course combination supports learning in weaving because the same basic elements of colours, structures and forms are applied. Expanding the Material and Surface course with one more additional course will be challenging for the students, and they will be forced to enter an area of discomfort. The students will need to take advantage of their former studies and reflect on their thinking more deeply.

In the 2016 Master's degree requirements, Technology is added as a compulsory subject for all craft students. In the beginning the course will be 5 cu, and the credit units can be increased later. Therefore, in the future hard materials and technology could be also added to the Material and Surface course. Of course, in that case the course combination must be well planned both in its contents and timing so that this integration gives added value instead of causing the students increased frustration and stress.

Over the years, the teachers have learned a great deal about how to guide students to cross borders and integrate their knowledge. Teachers must cooperate and prepare teaching together. The Material and Surface course forms an intertwined and progressive structure only when a teacher knows what the others are doing. Cooperation and integration needs planning and hard work. However, sharing ideas and developing them together into assignments and teaching innovations is rewarding. Furthermore, it is satisfying to see students' portfolios and experience their learning. The teachers consider that they have succeeded in combining four courses and in supporting learning from a subject-based orientation and transforming fragmented education into a thematically coherent whole. The course combination is definitely more than the sum of its parts.

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