The Rebellious Teacher or A Rebel with a Cause

An interdisciplinary view on sloyd science

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Existing research on the field of craft, or sloyd, education focuses on institutional frameworks characterized by having their own legal framework, politics, and defined purpose, whereas public spaces are not subject to similar regulation. Research in sloyd education shows how tools, materials, and artifacts are in a continual interaction among students, teachers, and peers. Recent research shows that craftivism (craft and activism) as cultural phenomenon adds new valuation and thinking contributing useful knowledge to the field of craft research. This article focuses on craftivism from three perspectives: first as a mediator between artifact and context; second as a learning perspective; and third as an identity activity. These three perspectives are introduced as The Activist Method. Research in craftivism shows that if an activist brings sub elements from craft and another topic together a new language is born. A rebel is not a counterpart to the activist. The study is based on teaching and combines materials and techniques within the field of sloyd education and natural sciences. Could both topics shine on each other and give the student an understanding of matter and meaning such as textile material and mathematical matters, such as length, distance, materialistic performance, and craft technics? The study took place during the Spring of 2016 at Freinetskolen, Copenhagen, in cooperation with Dark Cosmology Center, Niels Bohr Institute and Copenhagen Institute of Interaction Design, CIID. The activist purpose is to create a new language through craft and activism, which means the craft becomes a mediator between activist and another person. This article suggests possible learning perspectives from the outcome of mirror learning and identity both from formal learning spaces and informal spaces, and introduces the term 'rebel' as a new and different role for teachers to assume.

Keywords: interdisciplinary, sloyd eduction, natural science, learning space, poststructuralism

Questions to examine, an introduction

The purpose for this article first came to the author during a conference presentation. Part of the presentation was a detailed story about the empirical background of the ethnographic work among textile graffiti activists. What the activists had in common was that they all performed graffiti through knitted artifacts, such as by sewing the artifacts on poles or shaping the knitted pieces on a sculpture. The main purpose was an act that aimed to call out to their fellow citizens, wake them up and tell them a narrative. When discussing with one of the activists, the answer that was given to the researcher as to why engage in this form of craftivism (craft and activism) was that she wanted the material together with the tradition to send a message to the passing citizen who came across the piece of craft. Suddenly a woman in the audience at the conference shouted: "I also want to be a rebel! Please tell me more about how and why they do it! I want to know it all!"

What is a rebel? According to Oxford Online Dictionary (2017), 'rebel' means "a person who: 1) rises in opposition or armed resistance against an established government or leader; and 2) resists authority,

control or convention; and 3) a person who does not like to obey rules or who does not accept normal standards of behavior, dress, etc." The woman in the audience stated she wanted to learn from the activist performance and method in order to change rules in education. This paper explores the method and the material inspired by a rebel approach that is in line with the first definition. Criticism is understood as the act of resistance to any authority, control, or tradition.

A rebel is the equivalent of an innovative person, undertaking activism into the established educational discourse. An activist engages in activism in public spaces and enters into the established public discourse..The difference between the two is the space where the activism is performed: the activist does an illegal act according to the law in European countries, whereas the rebel breaks apart education topics and creates new ones: the rebel creates new topics in an interdisciplinary act.

- What did the activist do and why is it understood as a rebellious act?
- How can this act be reflected to the discourse of governmental rules of education and curriculum?
- How can we discuss criticism on arts and crafts education from an act of activism?

The woman in the audience who wanted to be a rebel saw a method to express not only herself but to allow the process, method and craft technique be the mediator through which she spoke. To understand the what and why of an activist's performance (question 1) the article introduces textile graffiti, "yarnbombing" or "craftivism" and how it started and why.

Figure 1: Happy New Sustainable Year! Stockholm, 2012 (Photo Stickkontakt)

The artifact is as important in the activist performance as the act is illegal. The artifact is always left alone in the open urban space, which means that the artifact speaks on its own behalf (Koch, 2012; Gelder, 2005). In this case, a rather simple piece of crochet takes its own space and speaks to people that pass by (Koch, 2012). This article analyzes how such an artifact can be considered from a learning perspective based on the perspectives of the activist/ learner, the artifact, the context and the audience (Koch, 2012). The activist combines different subjects such as craft and communication in an activist performance. Figure one shows how a simple artifact "talks" on the streets of Stockholm.

Situated position and purpose

The artifact can either be understood as a message or as something that mediates a new identity. Säljö (2000, 2005) has shown how an artifact performs as a mediating factor in learning and identity processes.

The context in which the artifact is situated is the delimitation of the space in which the meeting is carried out. This means that the mediating can be realized in different spaces; thus, the chosen space influences the reception of the artifact (Taguchi, Bodén & Ohrlander, 2011; Gelder, 2005). The activist performs in an informal learning space, outside institutional curriculum, and the teacher who wants to act as a rebel performs inside the institutional learning space, the so called formal learning space. Finally, there is the agency of others who are involved in the meeting, taking place in the context of both social and learning spaces. In this new context, others experience, receive, react and (possibly) act upon the meeting.

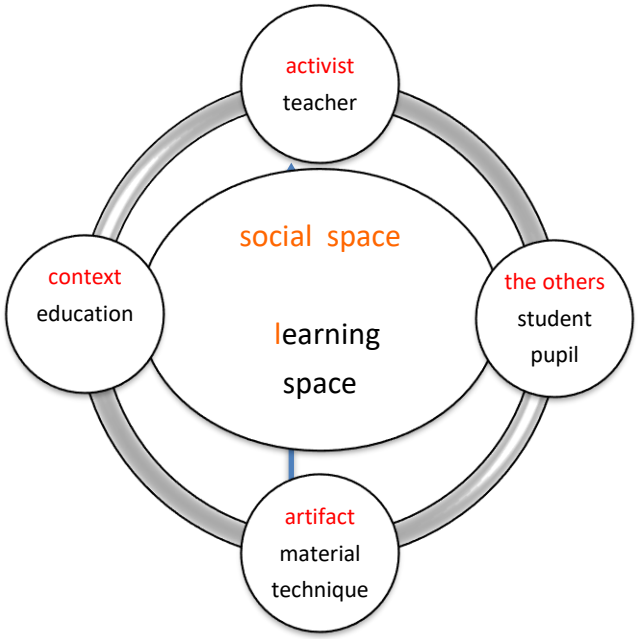

Figure 2: The subject´s possible conditions drawn in a model of the learning space (a remodel from Koch, 2012)

The model in Figure 2 presents the authors a visualization of the learning space presented in this article. It refers to and is based on sloyd education research, and on common assumptions related to learning spaces. The model may also be used to closely examine a given culture and helps to expose one of the many cultural spaces of social activity Throughout this paper, the agents, i.e., the subject (activist/teacher), the students, material/artifact, and context are considered within learning perspectives and the various opportunities for identity formation.

The model emphasizes the mediating function of the artifact and how it is used according to which kind of focus is placed on the model. The rationale behind the model is that it can be used with the purpose of being a structure through which a learning perspective may be analyzed (question 2). Another incentive is the reflection on how the newly obtained knowledge may be useful, and whether it is possible to influence the future of professional understanding, identity formation and self learning. Furthermore, the model contextualizes the relational meeting, hence the teacher's polar location and the circular drawing of the model in which the artifact/material/method is the main actor in mediating and meeting. One actor is the manufacturer of the crochet artifact, whose learning is driven by her/his activism and the idea of the action or the receiver, rather than through the institution's framework. In this way, learning becomes exploratory and linked to values through the knitted artefact/form. In short, one can argue that the activist method is a way to understand learning in a different way (Lave & Wenger, 2003; Koch, 2012; Säljö, 2000, 2005). The activist method applies elements from different subject areas which might create a new understanding and expression. This article highlights these

elements of the activist method in learning in which the purpose is to mirror traditional crafts with activism and a focus on the teacher's choice of what and how to teach. The rebellious teacher could be the teacher who is able to resist authority, control, or tradition, one who can review different topics, separate them from each other, and then put them together in new ways.

Theoretical position

To understand a rebel it is necessary to introduce the theoretical position from where the researcher writes in order to understand the questions asked and discuss new understandings in a constructive way. Coming from gender and cultural studies, it was a conscience choice not to claim a single scientific discipline (Lykke, 2008). Researching ongoing cultural change, it has been an ambition to capture phenomena that negotiates a new understanding of a culture's laws and rules (Sørensen, 2010). Drawing on poststructuralist theoretical approaches, such as the work of Judith Butler (1997), the researcher considers culture from a political angle and uses Foucault´s (1999) archaeological approach to the discursive history of the Western world in a large scale, on a smaller one the discourse of Education (Koch, 2012). The point of which the culture is investigated is often from the subculture as the resistance or criticism starts among the few and often the few gathered in a subcultural group.

The paper is written from a motivation to link the practicerelated experience and theoretical knowledge in education and training along with theoretical knowledge in cultural studies (Bal, 2004; Gadamer, 2007). It focuses on one's possibilities to negotiate an identity, e.g. a teacher who wants to become a rebel—The Rebellious Teacher—and to understand which learning perspectives can be discussed and explored. Identity and learning are important factors when you look at the way an agent is formed through socialization (Foucault, 1999; Davies, 2003, 2006; Säljö, 2000).

The article's *learning* perspective is based partly on Illeris' (2003, 2009) broad definition of the term:

> The word learning and learning processes refer to the interaction processes between the individual and his material and social circumstances, directly or indirectly, which are prerequisites for the internal learning processes that relate the mental processes (Illeris, 2009, p.15).

Each individual´s mental processes typically entail the learning processes inside the individual which may lead to changes or results through a process of experience which are recognized by the individual. Säljö discusses the interaction processes in a sociocultural learning perspective when he describes the interaction between learning and the world seen from a cultural perspective, as mentioned above: when the artifact and the context act as mediating factors (Säljö, 2000, p. 45); Koch, 2012).The importance of artifacts as an agent in the learning process is also described in research in sloyd education (Lindfors, 1999; Sjöberg, 2009).

The formal versus the informal learning process

When learning takes place in a different context than the normative approach that takes place in formal education, one can argue that learning escapes the teaching program/curriculum due to the activist method. Throughout the following, craftivism will be reflected on the discourse of the governmental method. Introducing the rebellious teacher one needs to change the discourse from where the learning perspective can be seen.

We can follow activist Erdes (Slöjdforum, 2008) in her description of her practice to embroider cross stitch in city buses in Malmö. Thus, we can understand that she takes a seat in the male dominated public space while she embroiders colourful cross stitch in the shape of birds and hearts on the bus. Erdes imitates the craft she has acquired as a normative cultural skill. By using cultural symbols for love and

beauty, i.e., hearts and flowers, Erdes balances the normative and brings it out of context into the city busses. One can argue that Erdes mastered rituals, taking her message, even though it is distributed illegally, towards acceptance and she becomes a new voice in the culture. Looking at a replica of an old craft form in a new setting (for example, in performing embroidery on city buses), one becomes confused and forced to create a new framework of understanding. This example shows how two different contexts meet each other in the exploration of something material and/or a specific artifact. Activist Ulrika Erdes (Slöjdforum, 2008). is an interesting source in this regard, as she speaks out on rigid old structures by declaring that she will feminize the public space and take care of her right to conquer it without asking for permission. Erdes knows that her acts of activism are offenses against her country's laws, rules and prevailing discourse. However, she is acting in accordance with other activists (Jalving, 2011). Understanding Erdes depends on how others perceive what is being said or talked about, and how others recognize its existence and brings it into use. Mastery is demonstrated by mastery of the rituals (Butler, 1997; Jalving, 2011). In this way, she masters both the tactile and the communication doing embroidery in city busses (Koch, 2012).

From activist to rebellious teacher

This article has no ambition to produce a truth about making crafts, which can lead to new professional syntheses and devices. The ambition is to tell stories about doing craft and to move the act of activism into a story of how one can become a rebel. The author's hope is that the story of arts and craft is told in a different way, and applied knowledge of learning in the informal space will provide an opening for new values of the Nordic crafts education.

The rebellious teacher has been introduced as equivalent to an innovative person, doing activism in an established educational discourse. On the other hand, the activist is performing activism in a public space with an established public discourse. The difference between the two is the space where they perform their activism, which means that both perform their skills but in different contexts (Edwards, 2010). The rebellious teacher could be teaching arts and craft *OR* natural science somewhere in Scandinavia in primary school or higher education. Situated from a teacher's position, an example will be presented which is based on teaching and combines materials and techniques with the field of arts and craft AND astrophysics. The idea is to assimilate pieces of knowledge from very dissimilar subjects as arts and craft and astrophysics. Learning and identity in a craftiest activist context together with learning and identity in a natural science context could challenge the teacher identity in school and education and give input to innovative thinking on the purpose of craft disciplines as well as disciplines in natural science (Koch, 2012).

In the beginning of the article, the person who wants to be a rebel was defined as a person who resists any authority, control, or tradition, or a person who refuses allegiance to, resists, or raises arms against the government or ruler of his or her country. Here, the results of the project show that the activist positions him/herself in society as an individual with a message that gives the citizens as well as the activist meaning and content. If a rebel is a person who can resist authority and can tear down sources of authority, one can imagine activism alias a rebellious teacher in schools: the rebellious teacher can tear down academic discourses and build new ones. By bringing craft into new territories, craft will ideally be contextualized in the world and gain an independent status. From the existing sloyd education research in the classroom, we understand that craft is a thing related to man more than things with an independent language (Dagsland, 2013; Carlsen, 2015)).

When individual disciplines such as knitting, embroidery and communication are applied into urban spaces, this results in the formation of a new language. Activist Brunaluna writes on her blog (Stickkontakt, 2012): "I knit, therefore I am!" The statement connotes the words of Descartes ([1644]

2009) about being in the world: "I think, therefore I am!" The act of knitting is replacing the act of thinking (Koch, 2012). The identity of the textile activist challenges the traditional image of the intermediary's identity, and, if used as a mirror for the purpose of the traditional professional identity, has a great significance for the development of the purpose of the arts and craft education.

Current *sloyd* education research provides a thorough background to understand the arts and craft process where pupil, teacher, materials and artifacts collaborate (Johansson, 2008). Can one imagine pupils/students from *sloyd* education, needlework and physics meeting to learn to measure lengths, divide and multiply with the aim of communicating a message? In this way, the Learning Space is not the classroom or the workshop; learning is created by the experience of other contextual frameworks (Lenz Taguchi & Boden & Ohrlander, 2011).

The Activist Method and the Analysis

One can imagine that the rebellious teacher provides inspiration for interdisciplinary research projects and reformulates tradition bound knowledge into new languages through new communication channels. One could imagine an interdisciplinary collaboration between arts and craft and a wide range of subjects, such as items and methods from the crafts being introduced along with natural sciences, maths, and languages.

Lenz Taguchi& Boden & Ohrlander (2011) argues that the child's subjectivity is created in school as a result of a relational interaction between a number of performative agents in the school (Lenz Taguchi, 2011, p. 185). Taguchi adds that an individual cannot be a cyclist without a bike because the cyclist is attached to the bike, and the action that contextualized the bike such as the path, road, and other cyclists are culturally linked to cycling. In the same way, a rebellious teacher in interdisciplinary action mediated through the making of arts and craft creates the actions that break the discursively established disciplinary boundaries. The rebellious teacher takes lead in the process of didactics materialized through the material and the artifact.

As defined in the beginning, a rebel is not a counterpart to the activist, the rebel is a mirror image of the activist in a different context. The article now turns to discuss a recent case in which craft and other learning subjects were integrated in the learning situation. During spring 2016, a project group was formed to conduct a pilot project together with teachers and pupils from 9th grade at a primary school, The Freinet School, Frederiksberg, Copenhagen. The project was developed in collaboration with Anja C. Andersen, PhD, Dark Cosmology Center, Niels Bohrs Institute, and artist/architect, Hanne Gård Granlund. The idea was to become comfortable with each other´s background in theory and practice and to see if it was realistic to combine basic astrophysics and handicraft. Could both subject/topics shine on each other and give the student an understanding of matter and meaning such as textile material and mathematical matters, such as length, distance, materialistic performance, and craft technics? The name of the study is "The Line and The Tread" (2016) and worked to develop the idea of bringing together minor topics from different areas of knowledge and apply them into a new form or topic. Inspiration from Wertheim and Wertheim (2007, 2015) gave an idea of how crochet and math can become an art project as well as learning on difficult mathematical formular. Wertheims project "Crochet Coral Reef" combines mathematics, marine biology, environmental consciousness raising and community art practice (2015). Where Crochet Coral Reef uses crochet to visualize the vulnurable coral reefs worldwide, The Line and The Thread aims to break down topics in the craft and design, math and physics curriculum into minor topics and challenges these in a process learning and of creation (Koch and Ahlskog-Björkman, 2011). We also see a link to Bal´s vision of performative practice (2004) is an interdisciplinary and multimodal approach across media and arts, which is discussed in resent sloyd science (Dagsland, 2013; Carlsen, 2015, Koch, 2012).

The empirical material was categorized into different layers of structure through a search both vertical and horizontal (Haavind 2001; Højgaard & Søndergaard, 2009, 2010: 315; Butler 1997: 43–49). This allows the researcher to focus on meaning created in experiences and events. In experiences and events we see no pre given script, as they are cited and socially produced (Højgaard & Søndergaard 2010, p. 315–338; Koch 2012). This method has its roots in Cultural Studies, Science and Technology Studies and Agential Realism. Højgaard and Søndergaard (2009) calls the analysis method for Multimodal Analyses of Constituency and link the theory to New Materialistic Theory, inspired by Barad (2007). Barad as a physisist develops theoretical physics and defines matter and meaning as inseparably linked (Barad, 2007).

The project, including the phases of teaching, was conducted as an experiment in a firm structure. The analysis of the experiences and events has multiple layers, which were structured along a **horizontal search** including: 1) Minutes from the first research period, 2) Documentation of the teaching: photos, observation and interviews, and 3) Evaluation of the whole project. When all categories are found by the horizontal search one can divide the categories into focus topics. This is th**e vertical search** where one can go into depth by analyzing, understanding topics, split topics apart and create new categories (Haavind, 2001; Højgaard & Søndergaard, 2010:315). We see a spiral going into the center from the perimeter of the first horizontal search.

The multimodal analyses of constituency included the following agents: 22 students, 2 teachers, one headmaster, a time schedule, the location and two researchers from universities and one artist. The project took place over a period of one and a half years.

The first step was to align members of the steering group from the different theories and practices they represented. The steering group met every half year during several meetings which were held at the working places of the researchers: Copenhagen Institute of Interaction Design, and Dark Cosmology Center. The idea was to become comfortable with each other´s background in theory and practice and to see if it was realistic to combine basic astrophysics and handicraft. Notes were taken and the dialogue took the researchers closer to the core of the idea of matter and meaning seen from their own topics. The meetings were seen as successful and when the steering group could imagine the shape of the rebellious teacher the project could start.

1) When all topics were related and intertwined, the researchers presented the idea from the point of view that a learner learns from doing, making and in the end from becoming first to the staff and next to the students at Freinet School (Koch, 2012). The becoming is the meaning maker as becoming is the outcome and becomes alive through processes of learning and reflection (Højgaard & Søndergaard, 2009). As Højgaard and Søndergaard write, this approach is "*a shift in perspective from a curiosity about a stable state of affairs…to a curiosity of becoming with the possibility of thinking through process, motion and disturbance/change"* (2009). The subject attains an independent position through the contextualization of the subject´s own position, doing, making and becoming, in dialogue with the material and the technique. Doing, that is to change the use of the thread into a tape measure or a mathematical form into a shape through crochet, creates the making which might give the learner a new identity as a performer.

2) When the content of the teaching plans were ready and confirmed, the project could start. The topics were separated which allowed the researchers to participate both as knowledge keepers, as teachers and as participants in a process together with the students. The method gave the researchers a tool to show the students how doing, making and being consists the performance identity and, similar to the learning process, through which the performance carries new connotations of sloyd into the future (Koch, 2012; Säljö, 2005; Højgaard & Søndergaard, 2009).

During winter, the researchers visited the Freinet School, discussed the idea with the entire group of teachers and the head of the school. The dialogues in different groups showed that the natural science teachers were very interested in participating. The steering group was informed about external circumstances, such as allowance to shoot and publish photos, use interview material anonymously, quote minutes and school politics.

For the researchers it was important to be part of the process in order to understand both the oral as well as the bodily communication that took place throughout the project. The researchers got through these dialogues with support for the project.

Teachers of Craft and Design, as well as Natural Science teachers were included as participants and actively participated in class during the entire project. The Craft and Design teachers were not able to be present all day during the workshop with the 9th grade students. Any field in education is not static, it undergoes change, just as culture and the researcher constantly do (Brinkmann & Tanggaard, 2010; Sørensen, 2010). In this way, the focus of the researcher is also constantly changing (Koch, 2012).

The researchers were the leaders of the project and the process, and teachers and students participated with their varying competencies. The teachers were part of the planning, and were interviewed before and after the project. The researchers made observations and photo documentation throughout all of the workshops, and the pupils were interviewed later. It was important for the researchers that the teachers were allowed to communicate their opinions through stories and narratives. The context was a workshop at the *Freinetskolen*, in which 22 students participated. Content of the project from which it was planned and executed included perspectives from which the analyses took place:

- The project examines what a line is, how it is created, and what it is used for?
- The project explores man, the earth, and the universe
- The project is built on 1) students assumptions; 2) learning spaces and context; and 3) the curriculum

The study is based on teaching, and it combines materials and techniques within the field of sloyd education and natural science. Documentation of the project is done by photo, interviews, diary and evaluation (Koch & Andersen & Gronlund, 2016)

The Line and The Thread, the activist method in practice

Below, the reader can see the slides used as an introduction to the project. The slides and text provide an idea of thought and how to connect complex mathematical formulas with simple craft techniques.
A ball of yarn was introduced to the students and the researchers visualized how a thread can be understood as a line. This exercise shows the student the length of one meter and materializes the line into a material which can be shaped into x numbers of shapes.

The introduction was followed by the question: What is a mask? If one uses ones fingers or a crochet hook/needle, one can create a mask. Repeat the mask to get more masks and a line consisting of loops. The first series of masks is also a materialization of how a shape can be. The examples are important to see with one's own eyes and create with one's own hands, as it is a creation process from the very beginning.

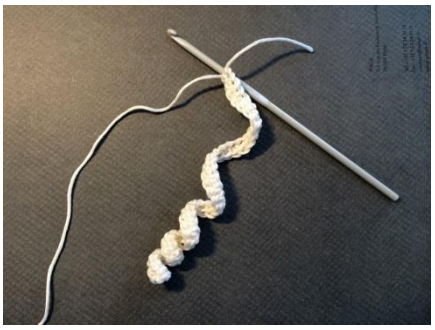

Figure 3: The second row creates a curled line. (Photo Hanne Gaard Gronlund)

Next, a row of masks and the technique allows a spiral line, which brings the student to the very first step of experiments. The Möbius Folding formula was introduced on the blackboard, which is an abstract and difficult formula to understand.

Figure 4: The Möbius Folding materialized by crochet. (Photo Hanne Gaard Gronlund)

The Möbius Folding was materialized by crochet. Crochet is an easy technique and allows for easier understanding of the materialized form. Now the line/thread is turned into a complex form. This form is similar to BrunaLuna as introduced in the beginning of this article and her Happy Sustainable New Year´s greeting in Stockholm, figure 1. The greeting is colorful, light in expression, easy to understand and to experience, and at the same time a complex form done by a simple craft technique.

After the introduction, the researchers interviewed the teachers to be sure that a similar understanding was established according to how one can understand that the thread as a line and the technique is one of many possibilities. The interviews were very open as the idea was to understand and develop at the same time. The interviews were not recorded, but the researchers took notes as they were all three present. The purpose was to create a natural and relaxed discussion. The activist method includes a process for learning and interdisciplinary interaction. The students took part of the meeting of separate disciplines, craft and math, by exploring the line. Interviews showed that the tactile understanding and The Möbous Folding gave an understanding of a complex form.

The interviews were followed up by the planning of 6 lessons with classes. The researchers as well as the teachers prepared the teaching from the learning perspective of both craft and physics, including knowledge from the introduction.

The first period of the fieldwork took place in autumn 2015 and it was executed in spring 2016. In all, the researchers had interviews with all teachers (one day), the leader (half day), the craft and natuaral science teachers (two days), the 22 students (3 hours).

The second period included the workshop and 6 lessons with 22 students and two teachers. First, an introduction was given by the researchers: one in astrophysics, one textile artist and architect and one in

sloyd science/didactics. From the first period, the researchers knew that they had to be precise and slow down the learning process as the interdisciplinary aspect of the project could create misunderstandings. The researcher had noticed that the students sometimes had difficulties switching from math to craft as they understood math more like a topic built up by truth and craft built up more by creativity.

Photos from the introduction are shown below. To give a different angle and understanding on material matter, such as the differences between plastic and linen,, we brought microscopes to the workshop. The microscopes gave the students an idea as to why the thread was stable, and why the fibers were either long or short and intertwined. Even if the plastic was long, it was also elastic. The linen showed to be the most stable thread and it was used throughout the workshop. The reader can see how the students work with the thread and the pencil and use these tools as a pair of compasses.

The workshop from thread to line, from man to universe.

First part

At first, different kinds of threads were introduced as the materials of the day. The students worked in teams and were challenged to find the most stable kind of thread among plastic, linen, wool and cotton. In comparison with a wooden ruler the students found three different kinds of threads which they cut off in the length of one meter. The thread was tied to a loot and measured on the length of the mark of the meter plus the stretch. The students could now choose the most stable thread according to the stretch. When found, the students took the scale and created their own scale, and the material they found could be used as a benchmark for further progression. They were asked to explore the possibilities of a thread and a line. Microscopes opened up their eyes for the way the thread was spun and the different lengths of fibers. Every group registered if the length changed, and measured how much in centimeters. The numbers were also registered on the whiteboard, and the numbers were discussed in relation to material. It showed that linen was very stable, after the first experience the wooden scale was taken from all groups. The experience and the results were discussed all together with the students, teachers and researchers.

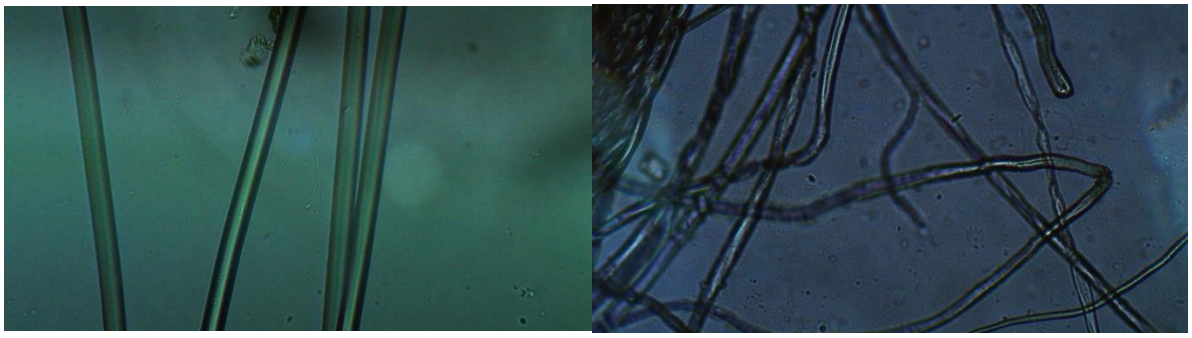

Figure 5: Microscope of plastic and linen

Second part

The next task was to measure each other in length, perimeter of their heads, and with their own cords from the shoulders to the top of the heads from fingertip to fingertip. Again, all results were registered on the whiteboard. The average of all students was calculated and the differences from the smallest to the tallest were highlighted. A new task was then given to draw oneself on squared paper according to one's own numbers on the length, height of the head and the wing (fingertip to fingertip). Leonardo da Vinci´s The Vitruvian Man shows the same process, and all together the visualization of da Vinci´s

drawing showed the next step which was that the circle was introduced. The experience and the results were discussed all together with students, teachers and researchers.

Figure 6: Students work with the thread as a measuring tape and a pair of compasses.

Third part

The students were then asked to draw at least 3 circles with their own string. They were then to measure the circumference and the diameter of the circle and measure how many times the diameter can be divided into the circle. What is left is Pi, (π). Pi was explained by the researchers, and all the results from the students were documented on the blackboard. The objective way to calculate a perimeter, Pi, include perspectives of the formulas used in astrophysics to calculate the perimeter of a star in the universe. The structure of the universe and the movements of stars were afterwards related to the earth, moon, sun, and in the end to man and ourselves. This part was discussed all together with students, teachers and researchers.

The teaching was completed and right afterwards the researchers asked for comments and questions. They then started a group interview on the perspectives of understanding, learning and experience. The interview took place in the classroom and was followed by one-to-one dialogue between the researchers, students and their teachers. Notes were taken and the conclusions drawn include statements of a deeper understanding of learning as the thread as a tool gave a new perspective, new understanding of lengths, Pi, and oneself as a length. A renewed interest in math, physics and craft as aspects on the topic was experienced and reflected upon. Some students underlined the importance of the structure of the workshop. They claimed that, among other things, the bodily experience provided a deeper understanding of their learning process. Some students claimed that they never understood Pi before they actually tried the formula on themselves.

At the same time, the project provided understandings of how materials and matter can be understood in different contexts as craft and natural science. The pilot project opened eyes and brought new ideas for future cooperation among different fields in education.

The workshop with participation from teachers and researchers gave a flow of knowledge exchange between different levels of experts and the students. Immediately, when some new question popped up the answer was given from an expert point of view. Right after the workshop and the interviews, the researcher edited the plan for teaching, which meant that new experience was added.

Discussion

In this article, the activist performance has been described and possible learning perspectives from the outcome of mirror learning and identity has been suggested both from formal and informal learning spaces. In the beginning of the article we saw the activist and the simple use of a thread goes through learning processes driven by her/his activism (figure 1, the Happy Sustainable New Year craftivism in Stockholm) and learns through the action or through the reflection of the action (I knit, therefore I am!), rather than through the institutional framework. It makes learning exploratory and linked to values and projects. Additionally, the definition of a rebel linked to the role of a teacher is discussed in order to give the teacher legitimacy in trying alternative partnerships and processes. Furthermore, a tactile concept (such as the action of crochet) is discussed as something very theoretical. And finally, it described how contexts encounter each other in the exploration of something material.. The observers who encounter the Happy Sustainable New Year craftivism in Stockholm are forced to understand its context and perhaps themselves in a different way within different encounters with this mysterious, funny alien element: Erdes´embroidery in the bus.

All together, the emphasis has been on exploratory learning placed in the context of the body/personal reality rather than through 'text books'. In relation to science communication, it makes the project more than a learning project: learning became a performative project as the students were led through a holistic learning process that was unified as aspects of possible new identity, both on a personal as well as a cultural level. Through the personal experience, the students incorporated scientific knowledge in a personal bodily experience. Of course, the performative is also part of the normal learning concept, but it became more evident in this project. Additionally, it emphasized the purpose of the project in how scientific communication is about arousing interest in the sciences, but it is not necessary for all of us to become scientists.

Communication through these learning experiences rather than focusing on the specific instead highlights the normal by constantly presenting experience with scientific objects of study. In this project, the proportionality between the universe and the body and the exploration of what a line/thread is becomes the matter that really forms the students' concepts of knowledge.

The term 'rebel 'was introduced as a new and different role for teachers to assume and the rebel identity and the activist method have been used to challenge the teacher identity in education. In this way, the rebellious teacher was created as a new identity, which can reformulate craft disciplines with the view of interaction with other disciplines; the rebellious teacher brings together craft science with natural science and provides input to innovative thinking on the purpose of craft disciplines. As said in the beginning a rebel is a person who among other choices, does not like to obey rules or who does not accept normal standards of behaviour, dress, etc. The woman in the audience stated she wanted to learn from the activist performance and method in order to change rules in education. The article introduces the term 'rebel' as a new and different role for teachers to assume. The article is also a manual can for teachers who want to try the rebellious way of teaching or to be a rebel with a cause.

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