Roberta Proto

That'll teach them!

Evaluation of K+K=K workshops' long term goals:
What do the children say?

Trondheim, June 2011

NTNU
Norwegian University of
Science and Technology

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Roberta Proto

Master of Science in Media, Communication and
Information Technology
Submission date: June 2011
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Acknowledgements

It is a pleasure to thank the many people who made this thesis possible. First and foremost I thank my supervisor Professor Letizia Jaccheri. She is the one professor/teacher who truly made a difference in my life. With her enthusiasm, inspiration, and her talent to explain things clearly and simply, she gave me the confidence to explore my research interests and complete this thesis. She provided encouragement, sound advice, good company, and lots of good ideas.

Professor Aksel Tjora (NTNU) contributed with valuable advice on interviewing in different language. Julia Krankenhagen from Culture bureau Mesén set aside time to meet with me and explain the process of organising and conducting the K+K=K workshops.

Thanks also to Audun Eriksen, sound artist and K+K=K workshop conductor for his useful suggestions regarding interview questions, and Pål Bøyesen artistic leader at the ReMida centre for welcoming the workshops to the ReMida.

This research could not have taken place without the cooperation of the school teachers and the children who volunteered as informant. For ethical reasons I cannot mention you or your school by name I thank you infinitely for your enthusiasm and readiness to participate in my research.

I would also like to thank my friends who encouraged me and patiently waited on the side line while I dedicated all my time to this research. Last but not least I thank my husband Maarten Broekmans and daughter Gaia for patiently putting up with my frustrations during thesis writing.

Roberta Proto

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Studere, studere, post mortem quid valere?
Sed ante mortem quid magnare?
cit. Rosalba Proto

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Abstract

The goal of this master thesis was to evaluate the K+K=K workshops' long term objectives by asking selected participants aged 11-13 years, about their experiences. The two-day workshop combined creativity and the OSS programming language *Scratch* to promote art, science and alternatives to computer games, amongst children.

The qualitative research was based on primary data collected through vis-à-vis semi structured interview, and on secondary data consisting of participant observation. Through a grounded theory approach three key theories were identified to apply to the data: constructionism, media theory and domestication theory. Data analysis yielded the following main topics: 1) issues concerning the research process and the children's experiences at the workshops, 2) issues emerging from the children's answers, 3) matters concerning the workshop's long term goals.

The principal conclusions about contextual issues provided suggestions for improvement of the research process as well as the children's workshop experience. Furthermore, matters that emerged from the children's answers indicated issues with the organisational structure of the actual workshop content and sparse prior information to workshop participants. By taking the informants' critiques to heart, future workshop experiences can be improved, facilitating an even more valuable learning experience for the children. Finally, analysis revealed viable options to increase impact of the workshop's long term goals. Adequate advance information on workshop content will enable participants to better understand the workshop and its goals. The children's answers confirmed that an informal learning setting like eg. the K+K=K workshop provides young people an effective introduction to different perspectives on computer use and boost their passion for art and programming.

TABLE OF CONTENTS

In 2010, local university NTNU celebrated '*250 years Knowledge City Trondheim*' to commemorate its long-standing intimate liaison with its hosting municipality. In this context, a number of workshops were organised in October 2010 to increase the range of activities for children and youth involving art and computer technology. The two-day workshops were dubbed K+K=K as a catchy acronym for "Komputer + Kunst = Kreativitet", which translates in English as 'Computer + Art = Creativity'.

K+K=K workshop aims and purposes

The long term objectives of the K+K=K workshops were defined as:

1.   to strengthen students' interest in art

2.   to strengthen students' interest in science/programming

3.   to provide creative alternatives for the use of digital media

Two school classes from different schools participated in the K+K=K workshops, the children were between 11 and 13 years old. The workshop took place at the ReMida centre, a centre which collects and offers a variety of materials for use in creative and educational projects. The centre is a cooperation between the municipality, the education project *'Reggio Children'*, the municipal waste company (recycling) and the local business community. The children attending the workshops were instructed and assisted by the programming artist, the leader of the ReMida centre, a PhD student and four master degree students, a senior researcher, and a project manager (Høyseth and Jaccheri 2011). For both workshops together, the children completed and published in total six interactive projects on the Scratch website. Both workshops kept record of children's activities by photographs, videos and observation reports, the latter were used as supplementary data resource in this research.

Høyseth and Jaccheri (2011) members of the organising committee and also present at the workshops give a description of the program implemented at the workshop:

1.   Introduction: short demonstration of a Scratch project

2.   Creation of two 3D characters, taking pictures of the characters, editing images, uploading the digital images of the characters into Scratch

3.   Scratch tutorial I

4. Make up an interactive story, create a storyboard and scenes in Scratch. Interactivity steered with home made sensors connected to the PC through Arduino boards

5. Scratch tutorial II: changing scenes: synchronization of animation, checking the value of the variables, checking actions of light, sound, and touch sensors

6. Finalize Scratch programming

7. Decorate a 'theme room' to present each group project

8. Presentations

9. Round-up and discussion

Apart from the round-up and discussion at the end, the workshops did not formally include feedback from the attending children. The involved adults, ie. the artist and instructor of the workshop, the leader of the ReMida centre, the university's researchers and master degrees students and the students' school teachers, were all very enthusiastic and positive about the workshops and unanimously agreed they were a success. However, a first-hand record of the children's own accounts of their experiences and opinions about the K+K=K workshop was lacking. For various reasons, researchers typically ask adults (eg. parents, teachers) about children's experiences and opinions, instead of asking the children themselves, often based upon the (mostly false) presumption that children are incapable of formulating clear and balanced answers, or that children are incapable to oversee and evaluate all aspects of a situation. In other words, there are *"... concerns about the cognitive ability of children to process and respond to structured questions about behaviour, perceptions, opinions and beliefs."* (Scott 2000:99).

As I was very intrigued by the validity of this presumption and at the same time, genuinely interested in the children's experiences with and opinions about the K+K=K workshops, I decided to give the children a voice by providing them the opportunity to speak their mind in one-on-one semi structured interviews. Why settle for hearsay information when it is possible to obtain information from the original source? Why not ask the participants of the workshop about their experiences and opinions? As implied by Scott (2000:99-101) and supported by the many references therein, children of 11 years and older (as in this research) are fully capable of understanding and evaluating situations, and able to formulate well-considered

2

responses to structured questions. Strengthened by this knowledge, I decided to obtain feedback interviewing selected children.

The research process

To prepare for this research, I oriented myself in published literature and past research concerning workshops, with special emphasis on the use of the programming language Scratch. A plethora of papers and other publications appears available, much based on Seymour Papert's Constructionist theory, as for example many of the academic publications and presentations listed in the research section of the Scratch website, many written by doctoral students supervised by Papert (eg. Harel, Resnick). Other useful articles were related directly to Scratch and written by MIT researchers (eg. Kafai, Peppler, Silverman). In particular the paper of Wilson and Moffat (2010) has substantial overlap with my research interests. In their research, Wilson and Moffat use the Scratch programming language software as a tool to introduce young schoolchildren to programming. They include feedback forms at the end of each class and use those to underpin their results in a quantitative way. They conclude that the use of Scratch has been very successful and the children made much better progress in the lessons based on Scratch than in the ordinary IT lessons at school. They also discuss cognitive and affective factors, which are based on Papert's idea that one should experience things to learn them and that such is most effective when the learning experience is enjoyable.

However, as I decided to apply a grounded theory approach to my research (elaborated in detail in the next section *Method*), I was open to other theories besides constructionism. The whole process of preparing the research, collecting data, analysing data and writing led me to two additional theories applicable on the data material, knowingly *Media Theory* and *Domestication Theory*. These three theories are the key theories used in this research. They guided me through analysis and interpretation of the data and offered insight and alternative perspectives. I was unable to locate much literature relating either media theory or domestication theory or both to art, science, workshops and/or experiential learning. Still, as the data clearly implied a connection between my research and these theories, I was not shy to use them in the analysis. I found that they actually broadened my perspective on the matter,

offered better insight in the identified issues and assisted me to arrive to the principal conclusions in addition.

Besides providing an answer to the research question, this research was also able to identify contextual issues and issues for improvement of the program and execution of the K+K=K workshops. The results led to the general conclusion that the workshop was a successful tool to strengthen students' interest in art and science and to provide creative alternatives for the use of digital media. Course objectives were either completely or partially accomplished, different views being exposed by different informants.

For what and for whom?
Initially, this research was done to provide K+K=k workshops organisers with insights in whether or not predefined long-term goals had been achieved. However, it turned out that the results of the research not only answered the research question of this thesis, but in addition offered information on contextual issues and criticism concerning the workshop program and implementation. The analysis of the contextual issues contribute to a better understanding of and higher alertness for consequences related to the context of a research. While the critique offered by the informants offers insight that contributes at improving future workshops. Listening to what the children had to say about their experiences at the K+K=K workshop has yielded information from a different perspective. Those that will benefit most from this research are eventually the children attending, as the results analysed from the data will help improve future workshop experiences.

Thesis goal and rationale
Goal of this master thesis is to perform an evaluation of the K+K=K workshop's long term objectives by asking the workshop's participants about their experiences and opinions.

This chapter discusses the methods and approaches used in conducting this research and details on how the research was done. A range of different methods and approaches were applied to maximise the chance to acquire accurate results. Methods for collection of data and analytical methods for the assessment of the acquired data are described in detail below.

Qualitative research

Deciding on what to research can be of great consequence for the choice of method. My choice to base this research on qualitative research methods arises from the decision to focus on the evaluation of the K+K=K workshop's long term objectives by asking the participants about their opinion about, and the impact of the workshop. Focus of this research is to find out whether, or to what extent, the project's long-term objectives have been achieved. It is imperative for this research to obtain insight in the participants experiences with, and personal opinions about the workshop attended. Qualitative methods are thought to provide multiplicity of viewpoints, respondents are given the opportunity and are encouraged to express their own personal point of view, the result is often rich and detailed data (Scott 2000).

Even though in this case the advantages of qualitative methods outweigh the disadvantages, the latter should not be disregarded. An example is that due to the labour and time intensive nature of qualitative methods, only a small part of the potential informants can be studied, time can, both for the researcher as the informant, be a reason not to perform/participate in an interview. This means that findings cannot be generalized to similar situations. As this is a case study of the October 2010 K+K=K workshop project in Trondheim, the aim is not to generalize, but to study and evaluate this particular project. Another example of a disadvantage of applying qualitative methods is that due to the intimate nature of qualitative methods, and interview in particular, the research can be subject to researcher bias. For instance, the researcher may influence the informant, inadvertently or on purpose, by asking leading questions and/or (unconsciously) show (dis)approval. Researcher bias is inherent to qualitative research as it is nearly inevitable that findings bear a mark of the researcher's perspective, as the researcher is part of the process. Doing research for this thesis I made effort to minimise bias, for example by being alert not to ask leading questions, and by asking

informants to give supplementary explanation when in doubt. In addition, I used data from a secondary source not collected by me for comparison.

Grounded theory

The method of Grounded Theory (GT) was of considerable influence on the methodological outlook of this research. In GT, theory is derived from systematically collected and analysed data and thus not determined upfront (Strauss and Corbin 1998:12). The key concept of this method is that theory needs to be grounded or rooted in the available data. When a researcher applies GT to his research she/he first starts with data collection. In this stage of this research it was important to focus solely on the informants and their experiences and opinions, and not to be influenced by own expectations or prejudice. Next step in GT is to code the data in order to identify main themes. In this stage the connections between the codes and different causal links became more and more clear. The subsequent step in the process is to select what is worthwhile to analyse. An important part of the ongoing process is to view the findings into a different context. This is what Dey (2007) describes as the core of Grounded Theory.

The framework offered by the Grounded Theory approach generates insight, facilitates identification of different patterns and highlights differences and similarities in the data. The purpose is to identify a theoretical framework in the findings, so that one can generate new insights. Categorisation of data naturally leads to the association of the data with certain theories. The main goal is to find new insights through the empirical findings. The outcome is an interpretation of the findings and not a basis for generalization (ibid, 2007:91). GT approach suits this study because the goal of this research is not to generalize findings, but to obtain insight in whether and how the K+K=K workshop's long term goals were achieved.

Mixed methods

In order to gain a keen understanding of the workshop and get familiar with the topic and the context I discussed the matter on multiple, separate occasions with two of the organizers of the workshop, one of them is also professor at the Department of Computer and Information Science at the NTNU. In addition I took the following actions to familiarise myself with the K+K=K workshops and Scratch (in random order):

6

- studying documents for internal use regarding organisation of the K+K=K workshops
- attending the evaluative meeting after the K+K=K workshops
- participating to the K+K=K seminar for professionals
- joined a class of the master course *Experts in Teams,* in which the program Scratch was used
- watching video recordings and photographs taken at the K+K=K workshops
- read *"Using Scratch to encourage children's creativity"*, a specialisation report (NTNU), written by two of the master degree students present at the two K+K=K workshops. This report includes observation notes (Leite de Oliveira and Nasambu Wasike 2010)
- reading *"Collaborative artwork creations using sharing activities and open source software tools"*, a specialization report (NTNU), written by a master degree student present at the two K+K=K workshops. The author conducted a passive and explorative observation of the workshop and its attendants (Ortolan 2010)
- visiting and exploring in-depth the Scratch website of Massachusetts Institute of Technology, download and install the program to use it myself
- reading information brochures and leaflets about the workshop project and the professionals' seminar

Knowledge and impressions gained from these activities, resulted in the choice to include the observation report made by two master degree students present at the two school workshops as secondary data source. The advantage of including observation reports made by different researchers is that it offers different perspectives and decreases potential for researcher bias. The observation report is made by researchers from different faculties. These researchers have in addition different cultural background than the author of this thesis, which can be argued to be a great advantage for diversity of viewpoints, which enhances research quality. The use of diverse methods offers complementary insight and the possibility to compare outcome (Payne and Payne 2004:230).

Primary data: Semi structured interview

I collected the primary data by performing face-to-face semi structured interviews. By interviewing (a selection of) the students that have participated in the workshops one receives

first hand information from *'[...] those who actually witnessed the events which they describe.'* (May 2001:180). This is well served by one-on-one interviews with the participants, as this type of interview has high probability of yielding thick descriptions (i.e. with sufficient/ample detail). Semi-structured interviewing is according to Bernard (2006:212) best used in *"...situations where you won't get more than one chance to interview someone."*. The interviews for this research were to be held at school and during school hours. Therefore I felt obliged to limit my interviews to a one time event and avoid overstaying my welcome by eg. using too much time or having come back for follow up questions.

The advantage of semi structured interview is that, although the researcher works with an interview guide, the set up is flexible. The interview guide offers a range of questions from which can be deviated both by the interviewer as by the informant. It allows for additional questions when more in depth information is required. This framework has the characteristics of a more conversational style of interview and two way communication, as there is opportunity for both parties to probe for details, or supply additional information. Therefore, the interview is perceived less interrogative by the informants, which potentially makes them feel more at ease, and creates a more intimate atmosphere in which informants tend to open up and go more into detail. This is a sensible choice in particular when dealing with child informants.

The pitfalls of this type of interview are eg. asking leading questions, failure to listen closely and correctly interpret the answers, failure to probe when necessary, and asking vague questions or questions with yes/no answers. As I was well aware of this method's disadvantages, I took precaution to either avoid these or detect potential faults on time by performing a practice interview with a guinea pig of the same age as my informants, and I offered my interview guide to my thesis supervisor as well as other researchers for critical review and changed or adapted it where necessary. The interviews were digitally recorded and later transcribed and anonymised before analysis.

Interview guide

For this research I decided to prepare a semi-structured interview guide to use in the personal in depth interviews with the children. Designing an interview guide allows the interviewer to consider a strategy and prepare tailored questions ahead of time and for a specific research situation. However, it also offers the possibility to deviate from the questions in the guide and ask different/additional and more exploratory questions when the possibility presents itself in order to dive more into the matter. The interview guide allows the interviewer to be prepared as a particular sequence of questions offers the interviewer guidance. As a consequence the researcher appears more competent and confident during the interview.

In organising the interview guide I followed the funnel approach as visualised in fig.1., and recommended by Tjora (2010). I started the interview by introducing the informant to the research, eg. explaining shortly about the research and why the informant is being interviewed, how information will be handled and anonymised and who will have access to the data. After the introductory stage I proceeded to the actual interview sequence asking general warm-up questions meant to set the informant at ease. Answers to these questions are usually fixed facts and the informant need not to use much thought in answering the question. Examples of questions in this stage of the interview are *'How old are you?'* , *'What is your name and age?'* etc. After the general warm-up questions, I proceeded to the stage with the in-depth questions which focus on the experiences and opinions of the informant. Finally I asked a series of 'wind-down'/closing questions.

Figure 1: Progress in semi structured interview; the funnel approach (source: Qualtrics University)

In order to avoid leading or vague questions I asked my supervisor and some fellow students to read my interview guide and to offer review and critics. Further more I performed a trial
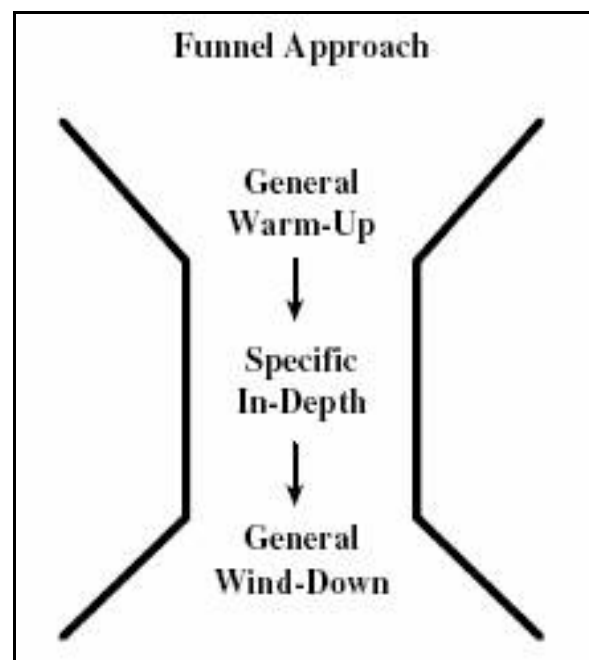
interview both in Norwegian and in English with a child of the same age as my informants, to see if all my questions were understood correctly and as intended, and asked to receive feedback. A number of times during the actual interviews, I chose to deviate from the interview guide, to elucidate either upon the question or upon the given answer.

Selecting informants: Sampling

A total of three workshops (free of charge) were organized in October/November 2010. Two classes, respectively consisting of 14 and 15 children of age 11-13, from two different schools were each invited to a two-day workshop. The third workshop was for the duration of one day and open to all interested children age 9-12. Two artists from the ReMida centre, a professor, a PhD student and four master degree students all from the Department of Computer and Information Science at the Norwegian University of Science and Technology (NTNU) in Trondheim, were present to assist workshop attendants and/ or make observations.
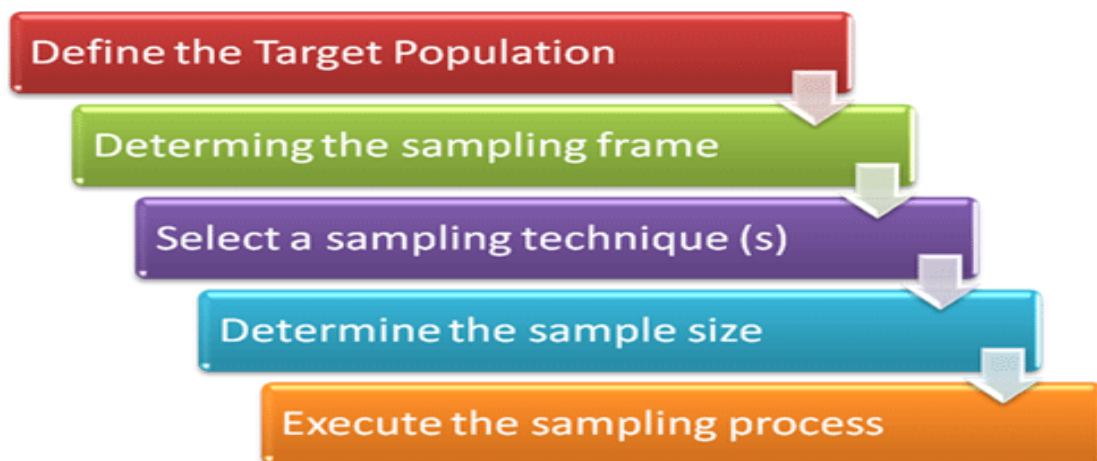
Figure 2: Sampling process (source: Bureau of Energy Efficiency India)

The sampling process was done in the sequence as visualised in fig. 2. The target population (the people that form the group you want to research) was in this case the participants of the K+K=K workshops. From this particular group of persons, I determined the initial sampling frame to be the three groups of participants that participated in the two school workshops and one open workshop. The most obvious sampling technique appeared to be *convenience sampling* (explained below) and an initial sampling size was set to five students per group. The next stage consisted of contacting the school's contact persons and the individual participants of the last K+K=K workshop.

10

Non-probability sampling/Convenience sampling

With non-probability sampling, the informants are selected on basis of their being part of a group. The informants were recruited amongst participants of the workshops. This means that a large part of the population is excluded from selection, and there is no possibility for generalisation. As the purpose of this thesis is to describe the experiences of a particular group in an exploratory way, thus to find out about K+K=K workshop participants' opinions and experiences, the goal is not to generalise. As I asked for volunteers, rather than making a specific selection amongst the students, it is characterised as convenience sampling (fig. 3).
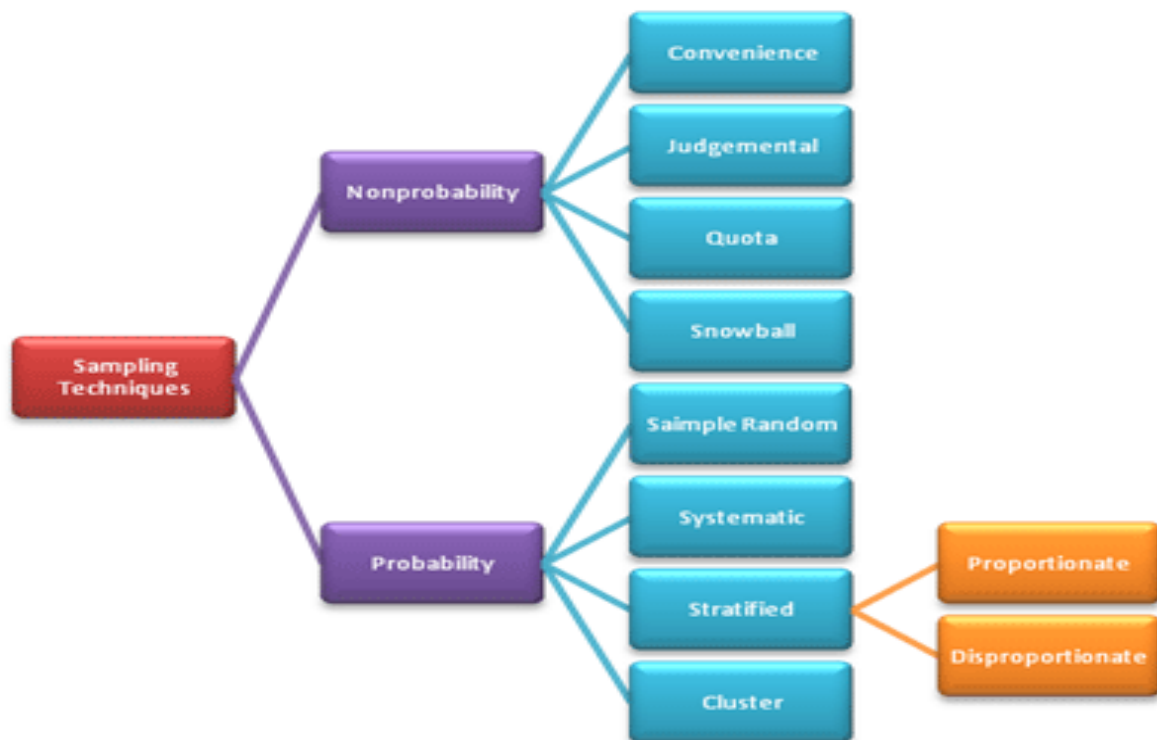
Figure3: Selection of sampling technique (source: Bureau of Energy Efficiency India)

Initially I tried to include the *open workshop* in my research. I was aware of the parameters being slightly different from the two school related workshops (eg. age of the children, only one day workshop, no relation to school), but decided to first include it in the interview stage, and decide later based on the quality of the collected data whether the open workshop was to be included in the research. To make a long story short, of the eleven people I contacted using the available contact information (email), only the parent of two siblings which participated in the workshop replied they were interested in being interviewed. As this would provide little data from the third workshop, I decided to drop the third workshop from the research, and concentrate on the two school related workshops.

11

I contacted the responsible teacher at each school by email, followed up by a telephone call. In the email I presented my project, explained my intention to interview (initially) five workshop participants. I included my official letter of information and form of consent, to be read and approved of by the teacher and distributed to the students and passed on to their parents. One teacher followed this scenario, while the other presented my project in class and asked the students if anyone was interested. Only the five students who were interested received the information letter and form of consent for their parents. I ended up interviewing six students at one school and five at the other. After the interviews were conducted and the material transcribed and evaluated it became clear that the point of saturation was reached. Interviewing more informants was not expected to provide radically different or more in depth data material, so no more interviews were deemed necessary.

Power asymmetry

Being well aware of the inherent power relations between adults and children and in this case between interviewer and informant, I took measures to extenuate the situation between the two 'extremes'. For one I offered the informants the possibility to be interviewed in pairs. James, Jenks and Prout (1998:190) argue that *"... the social mismatch between adult interviewer and child subject may be lessened in group interviews where children have support from their peers."* By offering the possibility to choose to be interviewed in pairs the informants experience a feeling of having some control of the situation and feel thus more confident. However, none of the informants made use of this possibility. Another measure I took was to explain every informant that he/she is considered an expert, and that their opinion is valuable for the research. This information was meant to evoke a sense of being important and to encourage the informant to speak freely. Another circumstance aimed at providing a sense of control to the informants was the fact that the interviews were held on 'their premises', ie. their school, which was a place well known to them and where they presumably felt at ease. Other general measures taken to tone down the power asymmetry between informant and interviewer included informal attire, prior information and explanation to the informant about the procedure, and explain that I was a student too and still learning.

The actual interviews

To make up for any potential lack of experience in interviewing I applied the technique of *'active listening'* to all my interviews. Kvale (1997:79) describes *'active listening'* as the interviewer's ability to listen in an active way to what the informant says during the interview. Kvale argues this technique is more important and has more impact on the situation and the results than mastery of different questioning techniques. Active listening is a way to listen and respond to another person which contributes to mutual understanding. When people talk to each other, attention is often not exclusively directed at the other, which applies for both speaker and listener. People engaged in a conversation are quite often distracted. *Active listening* is a structured form of listening where the interviewer focuses attention exclusively on interaction with the informant. This gives the informant the opportunity to find out whether the interviewer really understands what was said and vice versa. *Active listening* has several benefits. For one thing, it forces people to direct all attention to each other. Second, it reduces misunderstandings, because the interviewer confirms he understands what the informant said. Thirdly, *active listening* has the effect that people open up and disclose more than they otherwise would have, because it creates a feeling of intimacy.

The latter is extremely useful in qualitative interviews where one aims for elaborate and detailed descriptions, or so-called 'thick descriptions', to gain insight in the informant's situation (Rapley 2007:15). An informant who feels comfortable finds it easier to talk with the interviewer (ibid, p. 19). During the interviews with the children I focussed all attention to the informant and listened actively. I nodded to show I understood or agreed with what was said and in addition I made affirmative sounds like *'aha'* or *'hm hmm'*. I established eye contact in order to allow visual feedback between myself and the informant (Argyle and Dean 1965). The informants were visibly at ease and relaxed with the situation. Some of the children even kicked off their shoes and folded their legs on the sofa during the interview.

Secondary data: Observation

Secondary sources are in general used to reassess, adjust or confirm opinions formed through the original primary source (May 2001:180). In this research the secondary data source provide insight in the situation and circumstances in which the workshops occurred. The secondary data source in this thesis is the observation report written by two master degree

students that attended the workshops (Leite de Oliveira and Nasambu Wasike 2010). The students performed participant observation while working as workshop assistants.

The added value of observation as research method is that it offers better insight of the situation as is, as the observer watches and describes the situation in an 'as objective as possible' way. The data set used in this research is collected by two different researchers, which also raises objectivity. This is in contrast with the data collected through interview, where the data can be regarded as being subjective as it is supplied by an informant who already has experienced and interpreted the situation from his own point of view (Tjora 2010:38). A more holistic view of the situation is created by adding the observation report of the two K+K=K workshops to the interview material.

Transcribing, Sorting data, Recognizing & Analysing patterns
As the interviews were recorded, the next step in the process was to transcribe them. The transcriptions were done in a fairly detailed way, including eg. dialect, laughter, hesitations (*eehm...*) and repetitions, to maximise the amount of information deductible from the data. The advantage of a detailed transcription is that it leaves possibility for interpreting moods when analysing data (Kvale 1997).

The next step in the research process was arranging data into meaningful order to analyse it more effectively. As the amount of data was manageable manually, I did not use any research software. By then coding the interview transcripts for concepts, the text is reduced to manageable categories which allow to focus on content relevant to the research questions. Statements and answers belonging to the different concept categories are thus identified and highlighted in different colours. Following a Grounded Theory framework as described in Dey (2007:81), I broke down the coding process in two steps. First I identified the concepts closely related to the content of the data, this process is often referred to as *substantive coding*. In the second stage of the coding process I further defined the concepts identified in the first coding stage and put them where possible in relation to each other in order to relate and integrate them into theories. This stage is also referred to as *theoretical coding*. In a Grounded theory approach, identification and recognition of patterns in research data is a continuing process applied in all the different stages of data collection. Already while interviewing informants

14

and successively in transcribing the interviews, one needs to be alert and identify and recognise various patterns in the data.

Reliability and validity

The quality of a research project is usually measured by looking at the reliability and validity of the research. In a positivistic framework reliability is regarded as the way in which the research can be repeated and concluded with the same results, and knowledge is based on perceptual experience, not on interpretation or intuition. Researcher's interpretation is regarded as subjective and thus undesired in a positivistic research framework. In a qualitative research perspective the goal of the research is to describe and understand a phenomena and its context from the subject's perspective. According to Morse et al.:

> *"...reliability and validity have been subtly replaced by criteria and standards*
> *for evaluation of the overall significance, relevance, impact, and utility of*
> *completed research."*(Morse et al. 2002).

Input from the researcher is often viewed as an asset. Interpretation done by a researcher in scientific context is thought to offer an enriching perspective to the research. In this research the goal is to understand how the participants of the K+K=K workshops experienced the course in order to deduce in which degree the long term goals of the workshop project were reached. As suggested by Morse et al. (2002), measures to ensure good quality of the research project were taken, double checked and if necessary corrected systematically throughout the whole project in an iterative process. To maximise validity and reliability context and procedures are accounted for and documented in detail.

Ethical issues

Research ethics may be defined as the actions the researcher takes to ensure the principles of right conduct and to comply to accepted standards of social and professional behaviour. To ensure my work ethics follow these principles, I have studied different articles and guidelines. Donnay (1995) specifies fifteen points *'Code of ethics in scientific work'*, which have been used since the 1960's. These guidelines offer standards regarding, research ethics, writing ethics, giving references correctly, and inspire how to present research findings in the best possible light, emphasizing that quality and truth are of highest importance. Another important source providing ethical guidelines concerning documentary sources is the National

Committee for Research Ethics in the Social sciences and the Humanities (NESH) of Norway. This committee has drawn up ethical guidelines for research with the aim of offering an ethical tool to promote good judgment and ethical awareness with the purpose of raising ethical standards in social research. Finally I searched for registration and approval of this research project at the Norwegian Social Sciences Data Services (NSD) in order to ensure an ethical approach to my research. This thesis is written abiding by the basic principles and guidelines suggested in the three above sources.

In this chapter, I account for the theory that emerged from the data during this thesis' research process. In the period leading up to the project start, I prepared myself for the task by reading through lecture notes of previously followed theory courses at the NTNU[1], in order to refresh my memory. To broaden my knowledge and choice of theories I also read articles and books about theories that could apply to this research. As I determined to follow a Grounded Theory approach (as described in the Method chapter), I started by organising data collection. According to GT, data will lead you to appropriate theories. Although it is intended that one remains open and neutral during the whole research process including while scanning the data for theories, a certain degree of subjectivity cannot be avoided for the simple reason that it is unlikely that a researcher knows all possible existing theories, thus there is already a certain selection present. In addition it is impossible to guarantee objectivity and to be 100% unbiased, as subjectivity is intrinsic to human beings.

While creating the interview guide and during the interviews I was alert for clues that would point in the direction of certain theories. Early on in the research process the answers of the informants gave me an indication of the direction I should start exploring, namely Papert's theory of *constructionism*. In the process of transcribing, sorting data and recognizing and analysing patterns my presumptions about Papert's theory were substantiated by the data. Subsequently two additional theories were derived while sorting data and recognizing and analysing patterns ie. McLuhan's *medium theory* and Sørensen's *domestication theory* . These are the three theories that will be discussed in this chapter.

Constructionism

In general a workshop can be considered as a form of *experiential learning*. As the term already indicates, the concept of experiential learning is based upon the fact that a person learns from his or her own experience by direct participation in events or activities through discovering and experimenting with knowledge, instead of being taught or hear from others or read about it. This is not a new concept, the Greek philosopher Aristotle (384-322 BC) already expressed that "*For the things we have to learn before we can do them, we learn by*

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[1]   Norwegian University of Science and Technology in Trondheim, Norway

doing them." (2007:29). A few centuries later the Roman philosopher Cicero (106-43BC) states that the best teachers *inform, entertain and involve* their students *(Docere debitum est, delectate honorarium, permovere necessarium,* 46BC*)*. Cicero thus introduces the preferability of entertainment and involvement of the students in a learning process. Papert combines these thoughts and takes them a step further by stating that not only must we do (experience) things to learn them, but we must do *good things,* in other words have a good, pleasant experience:

> *"...<u>teaching</u> is important, but <u>learning</u> is much more important. And Constructionism means giving children <u>good</u> things to <u>do</u> so that they can learn by doing much better than they could before."* (Papert 1980). (underscore added by Proto).

Usually the scientific thoughts of Papert are not linked to Aristotle and Cicero, but to the work of the developmental psychologist and philosopher Jean Piaget (1896-1980), with whom Papert worked for a period of time in Geneva. Key focus of Piaget was the education and development of children. Piaget developed the theory of *constructivism* in which the main thought is that cognitive development in childhood is the base on which further development is constructed and expanded and therefore of utter importance. The mental process by which knowledge is acquired is cognition. This is the process of learning about, and understanding the surrounding world using perception, reasoning, judgement, intuition, and memory. Based upon this Papert develops the theory of *constructionism,* which holds that children are most successful in learning something when 1) they are given an active and creative role in the learning process and 2) the results of their creativity are presented to an audience.

Although Papert states that the consequence of attempting to capture the concept of *constructionism* in a definition results in presenting a very limiting picture and trivialises the theory's implications, he continues by offering the following short description:

> *"Constructionism [...] shares constructivism's connotation of learning as 'building knowledge structures' [...]. It then adds the idea that this happens especially felicitously in a context where the learner is consciously engaged in constructing a public entity, ..."* (Papert 1993:1)

18

Papert thus stresses the importance of creating a

• *'felicitous'* learning environment to facilitate learning, in other words the student benefits from being happy and in a carefree setting

• the construction of a 'public entity', ie. something to share and present to others that leads the student to evaluate and reflect upon his work and which is also something to be proud of and creates a sense of accomplishment

In short,

> *"Papert's research focuses on how knowledge is formed and transformed within specific contexts, shaped and expressed through different media, and processed in different people's minds."* (Ackerman 2001).
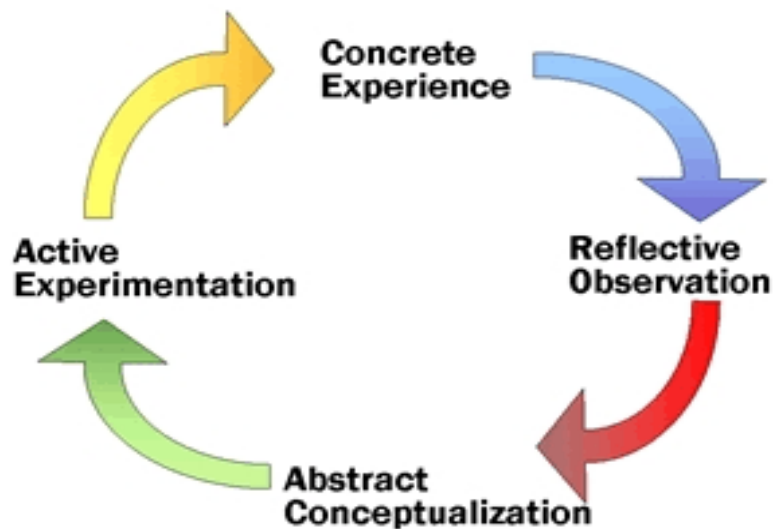
Figure 4: Kolb's experiential learning model (source: The Science Education Resource Centre (SERC)

Since the personal computer made his entry in the lives of 'ordinary people', Papert has advocated for its use in educating children. Through creating a learning experience by combining the use of eg. personal computers and a workshop setting one can accomplish the felicitous creative environment Papert envisions. A workshop setting encourages students to experiment with different scenarios and experience first hand the various results. In the spirit of constructionist learning the children learn by creatively doing (fig.4, active experimentation and concrete experience) and subsequently draw conclusions from their own experiences (fig.4, reflective observation and abstract conceptualization). The children first immerse themselves in a creative learning process by making an artifact, and when the artifact has been

created, they take a step back and go through an additional evaluative learning process when preparing to present and explain their creation to an audience.

In a constructionist approach, the child is not *taught* by a teacher. The teacher does not take the role of instructor, but rather acts as an assistant throughout the creative learning process. Instead of teaching as a one way event (from the teacher to the child), the children take the lead and are assisted. Only if necessary, they are slightly guided through the experience by the instructor or assistants. The essence of the learning process is accomplished through the creation process and the presentation of the product to an audience. In the final process the student is bound to evaluate and reconsider his creative process in order to successfully mediate it to his audience. It is in this final stage that constructionist learning is reinforced by the process of creating an object and share it with others (Harel 2003).

Price and Rogers (2004) define the following six key aspects of constructionist computer based learning activities:

1. Awareness; placing learning activities in a new and 'felicitous' space, raises awareness for the setting. More attention is directed to the task at hand and the level of alertness of the senses is higher.

2. Experience; a more intense experience entailing all senses produces greater diversity of impressions and experiences to explore and reflect upon.

3. Anticipation; is a basic component of natural cognitive systems, one has certain expectations on which further actions are based. Exposing the students to unexpected/unfamiliar context/effects evokes questions, wanting to find out how things work.

4. Exploration; "felicitous" contexts allow for a feeling of safety, which invites the students to explore boundaries and do some creative experimenting.

5. Authenticity; experience-based learning is real and self lived. This opens up for critical evaluation based on personal experience, the student can step-by-step reflect upon what he/she did and what could have been done differently.

6. Collaboration; working together with peers or assistants offers the possibility to exchange points of view and ideas. This interaction creates alternatives which otherwise would not have been exploited.

20

Medium Theory

A theory that emerged during the transcription of the interviews and became more and more obvious during sorting and analysing data is *medium theory*. The term '*medium theory*' is typically applied to literature that describe the effects of any technological medium beyond its content. A medium can be regarded *just* as a means for communication, an intervening substance through which messages can travel and which has no altering influence on the message. McLuhan regards this a very ignorant way of perceiving a medium. Well known for his work developing media theory, McLuhan studied the influence of communication media independent of its content. He states that every medium has certain unique characteristics, ie. *'the nature of the medium'* , which are decisive for the way in which a message is perceived and understood by its user (1973:19). Media theory focusses on studying the effects of the medium itself on the user instead of studying the content conveyed by the medium (Croteau and Hoynes, 2003:305). To analyse the effect of a (new) technology, one must assess **both the medium and its context**, due to their interaction the effect of a medium cannot be studied without taking its context into consideration (Lister et al. 2003).

Relating to this thesis three key ideas can be identified in McLuhans' work (Lister et al. 2003:75):

•   Remediation: Bolter and Grusin (1999) define remediation as the representation of one medium in another (in Lister et al. 2003:77), or as McLuhan stated: *'the "content" of any medium is always another medium'*. McLuhan (1973:15-16) states that, a new medium offers a different representation of the world compared to older or different media forms. There can be considerable difference in the way a message is perceived when mediated by different media. The message is *reshaped* when using different channels (= media).

•   Media and (new) technologies are extensions of human bodies and senses. A technological medium can be regarded as a tool which in its turn is regarded as an extension of the senses (McLuhan 1973). The social effects of a (new) medium on society happen because when taken in regular use the (new) medium becomes an extension of the user's senses, and as consequence demands social and mental adjustments from the user and its society (Croteau & Hoynes, 2003:307).

- "The medium is the message/massage", according to McLuhan different media require different degrees of engagement, and consequently have different effect on the user.

In his book The Gutenberg Galaxy (1962) he argued that when new media technologies are introduced into society, the balance of our senses are reworked, highlighting some at the expense of others.
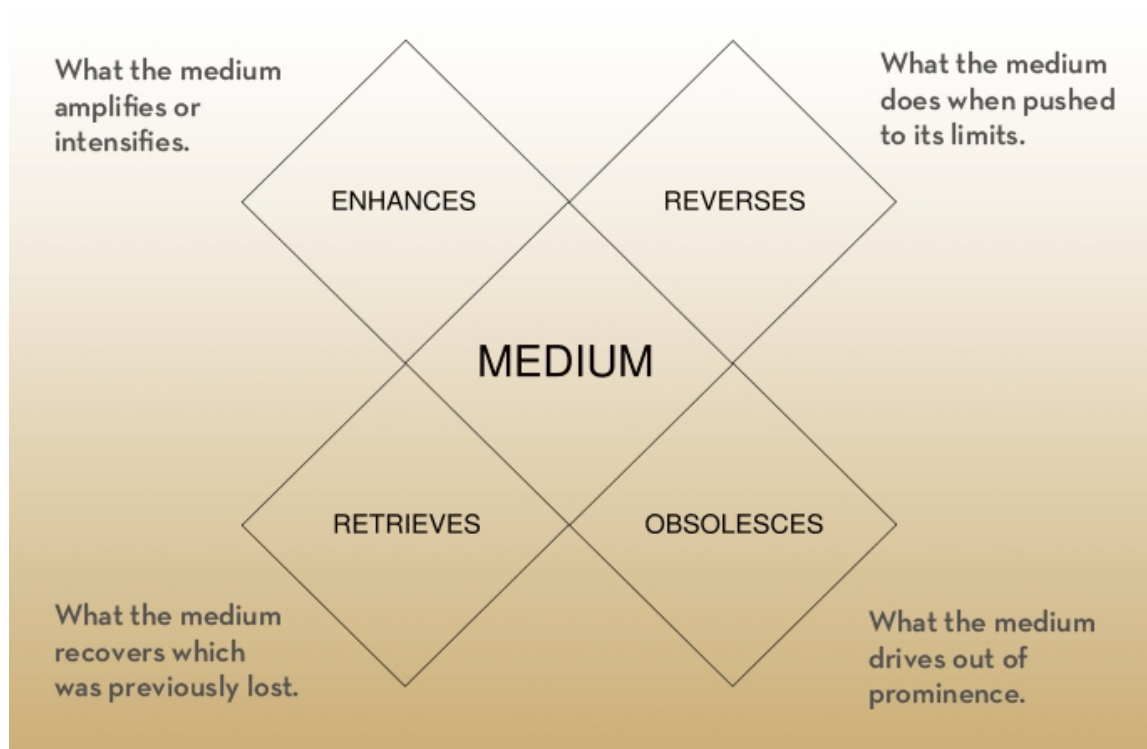
Figure 5: McLuhan's Tetrad: Laws of media model (source: a.parsons.edu)

In his posthumously published book *Laws of Media* (1988): McLuhan identifies four effects taking place when a (new) technology is introduced into society (fig.5). These affect both media and human artifacts and is an inevitable phenomenon which applies universally. McLuhan's tetrad depicts what he called the laws of media. A medium has four effects: it *enhances* certain features/characteristics of certain senses in the process, this happens at the expense of other characteristics, which in the process are driven to the background (*obsolesces)*. At the same time in the process certain previously lost or unused characteristics are recovered (*retrieves*) while when pushed to the limits of its potential, the medium will change to the contrary (*reverse*).

22

Domestication Theory

Domestication theory was originally formulated in the nineties to study the use and integration of new technological artifacts at home and into everyday life (Silverstone et al. 1992). The theory has been developed as a tool to understand technologies and innovations in eg. workplaces, schools, countries, etc. (Lie et al. 1996, Sørensen 2007a). The following definition describes the process of domestication of a new technology:

> *"[d]omestication is the appropriation of new technologies by consumers in households, workplaces and other private places, making them acceptable in their own familiar everyday life."* (Van Dijk 2006:91).

A point of interest are social standards related to ownership and use of the artifact (Sørensen 2007b). When a new technology is introduced to the user's everyday life it "*... is a two-way process in which both technology and humans are affected.*" (Aune 1996:92) which changes existing daily routines and innovates new ones, whereas at the same time, the user adapts to the new technology making it fit into his/her life. In domestication theory the process of integration is perceived as a dynamic and interactive process of adapting and being adapted. Domestication theory offers a way to investigate how the learning and integration processes of a new artifact take place at the **practical, symbolic** and **cognitive** dimension. Researchers working from this perspective are concerned with the infrastructure surrounding the user and with the dynamic process in which users learn from each other.

A negotiation between the user and the technological artefact takes place before and during the integration process. To successfully integrate a new technology in a users everyday life, both the user as the new artefact have to adapt. If adaptation is unsuccessful then integration fails, the artefact is rejected and not taken into use (Berker and Levold 2007). Both Aune (1998) and Sørensen (2007a), identify three steps in a domestication process:

- Users develop useful practices: how is the object / concept used or not used (**construction** practices). How does the domestication process create a new routine in the user's life or affects the use of the new technology?
- Users provide meaning to objects or concepts in the local context (**symbolic**: the construction of meaning). How does the new technology inspire and initiate new production of meaning, and influences the interaction between meaning and identity?

How does this affects the way the user presents itself in public? (ie. the image that the new technology creates around the user).

- Users acquire meaning and method of use of the object / concept (**cognitive** process). How does the user learn and apply the new technology in everyday life? (Williams et al. 2005).

How are new technologies adapted to everyday life?

Domestication theory distinguishes four different stages in the process of domestication. First, a new technology has to be acquired, which stage is called *appropriation*. The new technology is bought and/or made available in the everyday life of the user. The next stage is *objectification,* the new technology is placed, interpreted and constructed in the physical, symbolic and mental environment of the home and school. Then the user gets to the next stage: *incorporation* of the technology, indicating full integration in daily life, including adaptation of pre-existing daily routines or construction of entirely new ones to accommodate the new technology. The last and final stage in the process of domestication is the *conversion* of the new object. In this stage, new users convey the new product to their environment, eg. by physically showing the new technology to friends and family, or symbolically by for example mentioning the new object in conversation (Aune 1996). Together, the four stages described above define the process of domestication of a new technology.

From mutual construction to moral regulation

New technologies change communication practices, but not in a simple and unambiguous way. A concept under construction in the field of Domestication theory is 'moral regulation'. Morality is a public system of unwritten rules, that is known to all individuals to whom it applies. In Domestication theory the concept of morality is used in the sense of 'moral regulation'. Berker and Levold (2007) link this to domestication of an artifact and offer the following definition: *'moral regulation = patterns of use + social regulation'.* They argue that the integration and significance of (new) technologies can only be studied and understood by looking at the complex web of negotiations and moral regulation surrounding it (eg. the domestication process could be under influence of social pressure or peer pressure). The influence of moral regulation is an important factor which has impact on the way new technologies integrate in the user's everyday life.

One of the objectives of interviewing the participants of the K+K=K workshops was to obtain insight in the children's personal perspectives of and opinions about the workshop. The interview guide was developed with this goal in mind and questions were constructed as to facilitate formulation of the children's workshop experiences and to encourage sharing of their unique perspectives. The collected total data set comprised of sixty four pages of information, including the observation reports written by the assistants present at the workshop. Analysis of the interviews and observation notes yielded identification of two contextual themes and various key themes in relation to the K+K=K workshop.

Contextual issues

Before revealing the key themes identified in the process of data collection, coding, categorizing and analysis, I would like to draw the attention to particular conditions present at the workshops and interviews, for the simple reason that these could potentially have had an effect on the students' experience and perception of the workshop and on the interviews as reflected in their interview responses. These conditions were either specifically mentioned by the children or identified in analysis.

*Language*s

Already at the beginning of this research project, I wondered about whether language would have effect on the interview guide, the interviews and the interpretation of the data. Throughout the research process the influence of using different languages at the workshops and during the research appeared more important than initially anticipated.

The group of people that organised and executed the workshop consisted of 1) university people (ie. professor, PhD student and several international master students), although the common spoken language of the university people was English, the primary language of each individual except one in this group was neither Norwegian nor English. As a consequence, all assistance at the workshops was in English. 2) a cultural consultant, whose native language was neither English nor Norwegian 3) the artist leading the workshops and instructor of the

Scratch program and 4) the leader of the ReMida centre both had as native language Norwegian but were also fluent in English.

The two schools that attended the K+K=K workshops were an international school and a Norwegian school. The children at the international school spoke English at school, but not all students were English native speakers. The children of the Norwegian school spoke Norwegian while English was one of the subjects at school. None of the children participating in the interviews had English as first language.

The primary language spoken at the **first workshop** attended by the international school, was English. The primary language of both the artist and the leader of the ReMida centre was Norwegian, but presenting the K+K=K workshop in English did not present any problems. The university group spoke predominantly English, though some individuals also spoke Norwegian. No particular remarks were made by the informants about this situation during the interviews, although it is reasonable to assume that the use of a language which was not the primary language of any one present at the workshops had an effect on the experience.

The **second workshop** was attended by pupils of the Norwegian school and the common language was Norwegian. Both the artist/instructor of the workshop and the leader of the ReMida centre spoke Norwegian, but most of the assistants did not speak Norwegian, as a consequence the children were forced to ask their questions in English in order to get help from some of the assistants. One of the informants described the following situation[2] (R: stands for Researcher and I: stands for Informant):

> R: Do you have any suggestions about how the workshop could be improved?
> I7: Yes, there were one or two assistants that spoke Norwegian, the rest spoke English, and it was the rest that assisted us most, and some in our class do not speak English very well. So it was very difficult for them. So one day one of my class mates spoke Norwegian to them for a long time, and they stood there and looked and looked and looked... and then my class mate understood that they did not speak Norwegian! Haha...so I stood and chatted to them instead.... In the end they said in English 'I

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[2] Quotations from interviews that originally are in Norwegian are translated and numbered, the original text can be found in appendix 2, as recommended by prof. A. Tjora (NTNU) in a telephone conversation in February 2011

can't speak Norwegian', that was very embarrassing. They could have learned Norwegian, that would have been an advantage. (1)

The **interviews** were all conducted by me. My primary language is neither English nor Norwegian, although I speak both languages fluently. Already while developing the interview guide and later during interviews and analysis, the use of different languages in both the workshops and the research project raised some questions for consideration. For example both in English as in Norwegian the word workshop means either 1) a small workplace where handcrafts or manufacturing are done, or 2) a brief intensive course for a small group (Wordnet Princeton). In hindsight, analysing the interviews, I realised that some children referred to the ReMida centre and thus not the K+K=K course when asked about the workshop.

> *R: How did you perceive the workshop?*
> *I4: We came there I thought 'wow' that was so cool, I went there and looked at everything and stuff, and I was, ooh maybe something..., every little corner has one thing in it.*
>
> *R: How did you hear about the workshop?*
> *I5: The Remida? We, I heard about it in class when they said we were going to do a field trip there*

Vague terminology

Goal of this master thesis is to perform an evaluation of the K+K=K workshop's long term objectives. The use of the words *Art(s)* and *Science(s)* in the goals appeared to cause confusion and miscomprehension because they were not sufficiently defined. For example the use and translation of the word *science* proved to be a challenge. After having spoken to the workshop organisers, the word '*science*' as used in one of the three long time objectives, comprised of the science subjects as a whole (eg. mathematics, physics, chemistry, IT). In Norwegian language there is one word for this group of subjects, notably *'realfag'* (pronounced as: 'ray-AHL-fahg'). I used this word in the interviews conducted in Norwegian. To my surprise, the informants were not familiar with this term. Later, I was told by their class teacher that the term *realfag* had not yet been introduced to children of this age, and that in addition it was a bit old fashioned and only in use at universities. Consequently, I ended up having to explain

the term to the Norwegian informants. Some understood the explanation, while others kept having no clue as can be determined from their response:

> R: What is realfag to you?
> I7: I am not sure what realfag is.... is it like 'reality' or so?
> R: No, it is 'science' in English
> I7: Realfag for me is knowledge (vitenskap), space and such things. If we have to relate it to the workshop and things that interest me, so yes, it had something to do with that because we had to learn to make our character in Scratch. And there was a group who situated the character in space, so we learned about that yes... (2)

> R: How would you describe your interest in arts and realfag?
> I8: Realfag?
> R: Are you not familiar with the word? It is 'science' in English
> I8: Research?

And after explaining the word realfag more extensively to the informants specifically mentioning mathematics, physics, chemistry and IT, some still did not fully grasp the meaning of the word:

> R: What is realfag to you?
> I8: Realfag? I think it is just ordinary subjects like Norwegian, mathematics, English.. that kind of subjects. That's what I think.. I actually don't know what it is. I have not used that word so often (4)

> R: In what way does the workshop have something to do with realfag?
> I9: Eh, of course we used Norwegian and English there, the students spoke English, so we used quite a lot of realfag because there was Norwegian and English and data in it, so I would say we had much use of realfag (5)

A similar problem occurred using the term *'art'*. When the informants were asked what *'art'* meant to them, they described art as eg. sculptures, drawings, paintings, buildings, music. Although the informants were able to connect creativity and art, the use of the vague and not further specified term *'art'*, created slight confusion when answering some of the interview questions.

28

Key themes I: What do the children say?

The K+K=K workshop was a new experience for the informants and represented a break from daily school routine. All informants were very positive about the 'different' way of learning, and were enthusiastic about the break in everyday school routine. Despite all their enthusiasm and the positive opinions about the workshop they also managed to be critical in their evaluations. Some criticism was quite open and obvious, while other emerged through the analysis of the interviews. Analysis yielded the following key themes:

Information about the workshop

During the interviews it quickly became clear that the two school classes that participated in the K+K=K workshops had not received extensive information about the course in advance. The information they did receive lacked in detail, and did not disclose the purpose of the workshop (goals). The teacher acted as intermediary informing the children about the workshop. Information was provided in an oral announcement made in class by the schoolteacher and a written consent form addressed to the students' parents. The sparing distribution of information had various consequences.

In the interview the informants were specifically asked about the information they received prior to their participation in the workshop. Most of the students answered they did not receive much information about the workshop and its goals. Some did not seem to mind, and said they still were very interested in participating. Their answers could of course be affected by their positive experience at the workshop ergo if the experience is positive, then the information they receive upfront doesn't matter that much. On the other hand, if the workshop had turned out to be a disappointment, then one would focus more on the expectations they had and thus on information they had been given in advance. In this case the limited amount of information did not really have influence on the students' participation, it was part of the class curriculum and there was no question whether to attend or not. The following quotes are a selection of the informants' relevant answers regarding the amount of information they received:

> *R: What kind of information did you receive about the workshop and its objectives?*
> *I4: That we were making a movie and aah... on the computer like...a story...but when we came there it was kind of different.*

R: So you think the information was a bit different and you expected something else. Did this information raise your interest in the workshop? Did you look forward to attending the workshop?

I4: Yes I looked forward to it, but when I got there it was even better than I thought it would be

I5: We received that it was... we were going to build some type of things, and use this computer program

R: Did this information raise your interest in the workshop? Did you look forward to attending the workshop?

I5: I didn't get a lot of interest from it, from that specific information, but when we came there then it was kind of fun...especially when we started with the Scratch. I don't think I would have chosen to go myself, because we didn't get a lot of information first, I just got some basic information we were going to look at a program and how it is used, so I don't get specific interest from that.

However, the limited amount of information did affect the expectations of the students. The three long term goals the organisers of the K+K=K workshops had set for themselves were not conveyed to the children, as a result the children had no particular expectations in this regard. The children were not aware of the course's particular objectives.

R: Would you say the workshop had any influence (positive/negative) on your opinion about free computer programs?

I5: I didn't get any influence of what they were saying, and now that you are telling me these questions I haven't even realised it was science or arts it was about.

R: What kind of information did you receive about the workshop and its objectives?

I6: I received the information that it was this technology centre and we were supposed to learn how to use this program called Scratch

The students might have just received too little information or maybe not enough to satisfy their need for information. It is of course possible that they did not pay enough attention when the information was given:

R: Were you informed about the workshop's goals and why you were going to participate? [continued overleaf]

30

I10: No (9)

Another possibility is that the four to five months between the actual participation in the workshops and the interviews had an influence on how much the students remember of the quality and amount of information. The following was said by one of the informants:

> *R: How did you hear about the workshop?*
> *I8: It was the teacher that informed me about going to the ReMida, we did receive a*
> *bit of information about what it comprised of, and what we would do at the ReMida*
> *and so on. I don't remember... it's starting to be a while since, but... we did receive*
> *a bit of information about what we were going to do etc, yes (10)*

This indicates the possibility that the students could be better informed than they remember.

Learning by doing: Workshops

There was great enthusiasm for the workshop as a different way of learning. Informants described the K+K=K workshop as a positive and creative learning experience in which learning was relatively easy, interesting and pleasant. Below list represents selected answers to the question *'Do you find a workshop a good way to learn something in general?:'*

> I: Yeah definitely!
> R: Why is it so different to learn?
> I1: It was a bit easier then if I had done that in school, because it's easier to listen when you
> are somewhere different and we had everything there, so we could see it.

> I4: Yeah, its better than maybe just reading and then if you don't understand something, yeah
> you wouldn't, but then if you do it, you actually learn how to do it

> I8: Yes, it was a very good way to learn creativity, yes! And when you then finally
> are busy creating things it is much more fun than write in a exercise book. (6)

> I9: Yes! I think so, because there was a lot to learn in the things we did, it was not just
> play and fun. There was a lot to learn and we were obliged to pay attention if we
> wanted to succeed. (7)

The DIY character of workshops makes that participants immediately can see results of their personal efforts. At the K+K=K workshops the participants were asked to write a story line

and create the story's two main characters from scrap parts available at the ReMida centre. These characters were then photographed, uploaded and used instead of the standard sprites provided in the Scratch program. The children used the Scratch program to create an interactive animation of the story on their computer. When the animation was completed, they presented it to the other workshop participants, teachers and assistants, where after their projects were published on the Scratch website. See for example fig.6: screenshot of an animation made at a K+K=K workshop (and compare with image on cover).

Figure 6: One of the K+K=K projects published on the Scratch website

Some of the informants specifically mentioned a sense of achievement and accomplishment:

> R: Would you say the workshop had any influence (positive/negative) on your opinion
> about science and computer programming?
> I1: Yes, because I always thought that it was really hard and something that I would
> not be able to do myself, but ehm, it's .. it was something that I could do myself!

> R: Which of the things you have learned do you consider most valuable?
> I: That I can do that and try to make something, like that for myself! I never tried that
> before, so...

32

R: Which of the things you have learned do you consider most valuable?

I9: Eeh, I don't know. That we got to see the film when it was completed, that we got to see the results (8)

Workshop design: Start-up errors

The workshops conducted in October 2010 were the first, so there was no knowledge or experiences from former courses available. The workshop setting consisted of three main elements: the use of OSS program Scratch (programming), the creation of two story characters (creativity) and the presentation of the animation. After having analysed the participants' answers about their experiences at the workshop it is fair to say that these first workshops slightly suffered from start-up errors. Three main points were identified.

Waiting: There was occasionally too much time between the workshop's different sections which led to impatience, boredom and irritation. The following was mentioned in the observation reports:

> *Giraffe and Robot group - Day 1: 10.30 : They finish their two artefacts and take them to A. to take pictures which will be imported to the computer for use in their projects. Pictures are edited and put on each of the computers, while still waiting for the other groups to finish they discuss their story and cooperate well.*

> *Clown Group - Day 2: 13.30: The group had completed their work and was now waiting for the other two groups to complete. Boy comments "When shall we perform?". At this time they became impatient they didn't have anything to do as they had already completed all their tasks as well as setting up the room for their work to be displayed.*

In the interviews there also was mention of long waiting times, boredom which detracted from the informants' enthusiasm and positive experience:

> *R: How did you perceive the workshop?*

> *I2 : It was different from a normal school day, and I really enjoyed it, I wish it lasted maybe a little bit longer, and they should have explained a little bit more because sometimes you were very confused and couldn't get help, or you didn't get help and you had to wait a long time.*

R: What parts did you like, what did you not like at the workshop?

I4: I liked.... ehm...almost everything. Maybe... taking the pictures was a little bit boring because we just had to stand there and wait.

I5: I didn't think it was very fun to sit all the time and then we had computer and then we waited all the time to be told what to do.

Instructions for Scratch: According to some of the informants, working with the Scratch program was slightly difficult. Some would have liked to receive more extensive instructions beforehand. Inadequate and/or insufficient explanation were mentioned as a negative side of the course. A number of participants found they sometimes had to wait a long waiting time to get information necessary to proceed. Had they received adequate instructions, then there had been less need for assistance. By giving the participants more information upfront, as they self suggest in the quotations below, they become less dependent on assistance and waiting times become less.

R: How did you perceive the workshop?

I2: It was different from a normal school day, and I really enjoyed it, I wish it lasted maybe a little bit longer, and they should have explained a little bit more because sometimes you were very confused and couldn't get help, or you didn't get help and you had to wait a long time

R: If you could suggest changes for the workshop, what would those be?

I3: Maybe some help, a bit more help in how to use the program

R: Because there were people there that could help you but they were walking around? They were not there for you alone?

I3: Yes, they were there sometimes but not always

R: If you could suggest changes for the workshop, what would those be?

I10: Maybe, as I mentioned before, a bit more help to get started with Scratch, a bit more information upfront. (11)

Technical equipment: Another matter that stood out in analysis were issues with technical equipment. The students were sharing laptops to work with the Scratch program. However, due to lack of program updates and malfunctioning of the laptops, failures occurred which

resulted in eg. shut down. As a result of the computer failures a few of the groups had to share a laptop.

> *Observation: Party group - Day 2:*
> *10.30 am: The two scenes are now on one computer. Boy says "Am really getting bored, I need to do more". At this point they are working on one computer. The children have too much time on their hands and are not able to concentrate with use of one computer.*
>
> *R: Do you have any suggestions about how the workshop could be improved?*
> *I3: Maybe if it was more tidy and some more people being there and more computers so we don't have to share with other groups*
>
> *I6: I am not a big fan of the Ubuntu OS I would say, maybe you could get something else or update some video card drivers as the computers were crashing from them*
>
> *R: What parts did you like, what did you not like?*
> *I6: I liked that there were, was, lots of varieties to make your own character, but the computers, they were always crashing*

This situation was not so *'felicitous'* or *'happy and carefree'* as it could have been, and detracts from an otherwise positive experience at the workshops.

After the workshop

As part of a short evaluation at the end of the K+K=K workshops the programming artist and also instructor of Scratch asked the question *'Anyone wants to continue with Scratch?'*. As a reaction to this question the majority of participants raised their hands (Høyset and Jaccheri 2011). The following questions that in this case beg for an answer are: What happened after the workshops? Did any of the children introduce the Scratch program into their everyday life? In other words: did a domestication process take place? During the interviews, which happened four to five months after the students participated in the workshops, I asked the informants whether they used Scratch, or any of the other tools they got familiar with at the workshop, at home. Some of the informants found the program online, downloaded it and used

it at home. Others had some difficulties either with locating the program online or downloading it:

I1: No, I don't know where to find it so...

I5: No, because I didn't know that it was free, or I didn't know anything on how to get it if I did

I8: No, I tried to find it with Google, but did not succeed (12)

I11: As said before, I wanted to. I have only tried to download it at home and here at school, but did not succeed (13)

Some students were not familiar with Scratch prior to the workshop. After they became interested some attempted to locate the Scratch website afterwards, unfortunately not all did succeed. So even when most of the K+K=K participants initially had the intention to continue using Scratch only a few succeeded.

Relating to the last stage of domestication ie. *conversion,* one of the questions asked during the interviews was whether the informants had spoken about the K+K=K workshop with friends and family. In the final stage of domestication, users introduce the new product to their environment, eg. by physically showing the new technology to friends and family, or symbolically, by for example mentioning it in conversation (Aune 1996). Some of the informants did not mention the workshop to friends nor family at all, while others thought it would be of no interest to their conversation partner:

I11: No, I have not told so many people about it, and at home they were not very interested. (14)

Then again, others were very good at conveying their enthusiasm about the workshop:

I7: Yes, I did tell my friends and parents and others about it, they said it was great and my parents said it was very good... but as to my friends...I think it is better if they get to experience it, than if we just speak about it. (15)

I10: Yes, I spoke with other schools and stuff. I said it was good and recommended it, I also recommended people to download Scratch (16)

These last two informants were clearly of the opinion that experiencing the workshop and *'Scratch'* would be more persuading than hearing about it or as the proverb says *'actions speak louder than words'*.

Key themes II: The long term goals

As the research goal of this thesis is to find out if, or to what extent the K+K=K workshops succeeded in achieving their three self-imposed long term goals, I included straight forward questions about these three goals in the interview guide. In the general, warm-up part of the interview I asked the informants general questions about their interest in art and science, and about their computer use. Later on in the interview I concentrated on the three specific subjects of *art, science* and *alternative computer use.* The informants' answers yielded the following analysis results.

Increasing interest in art / creativity

Both in the warm-up and the in-depth phase of the interview, questions regarding art and creativity were repeated. I received very enthusiastic reactions about the creative part of the workshop and most could see the link between art/creativity and the workshop. A few of the informants pointed out that the workshop introduced them in to *'different versions'* of art and creativity. The workshop offered the informants new perspectives on art and creativity.

R: Did the workshop increase your knowledge about arts, or make you more interested?

I1: Yes, because I don't usually make something myself, so when I am encouraged to do it I expect to get more interested in it

R: Would you say the workshop had any influence (positive/negative) on your opinion about arts?

I1: Ehm, yeaah because first I didn't think of art in that way but now I can more see that what art is

I8: When I hear the word 'Art', I think.... the first I think about when I hear the word 'Art' is a painting. 'Art' has become more fun to me after we have been there, because

when we could create those puppets etc. and such that is art. It is a nice version of art I think, compared to other things.(17)

I11: I think it has become more interesting to me, before I thought a sculpture or a painting, but now I think it is so much more than that, art is that what you call art. It's like art is everything... it varies from person to person
R: In what sense did the workshop have to do with art?
I11: Well, we learned to create something, both when we made the puppet and also when we made the video clip, since the computer is also used to create something
R: Did the workshop increase your knowledge about arts, or make you more interested?
I11: Yes, I now find that art is so much more interesting, I find it is more enjoyable to look at things and see them from different perspectives (18)

Increasing interest in science and programming

Although most informants were very positive about the workshop on the whole, when asked directly, they did not immediately make or see the connection with science or programming. Informant I4 for example first says '*no*,' then hesitates and after giving it a short thought sees the connection between the workshop and science/programming.

R: Would you say the workshop had any influence (positive/negative) on your opinion about science and computer programming?
I4: No...I have... I don't know...it kind of changed my mind, I didn't really... I thought that those programs, on the computer like that, I thought that that was only for maybe houses and stuff, because my dad did that. But now I found out you can make movies and things for children too

While informant 7, needed a little reminder to see the connection:

I7: I wouldn't say the workshop had anything to do with science (realfag), because it had something to do with art, and these are two very different disciplines
R: What about the use of Scratch?
I7: Indeed... It included that, so it did have something to do with science (realfag) after all (19)

Although these informants agree that the workshop broadened their perspectives on science and/or programming, they were a tad confused, and only after being asked about it in the

interviews they realised there was a correlation between their increased interest and broadened perspective on the one hand and the workshop experience on the other. Some, as eg. informant 5 did initially not see any connection:

> *I5: I didn't get any influence of what they were saying, and now that you are telling me these questions I haven't even realised it was science or arts it was about*

Introducing an alternative to computer games

The free OSS Scratch program was used in the workshops. Scratch is developed to encourage beginners in programming by exploring and making learning an interesting and enjoyable experience. For most of the children it was their first introduction to the program, as most were not familiar with it prior to their participation at the workshop. The Scratch program enabled the children to create their own playing environment in the computer with a script they jointly developed and characters they created themselves from materials available at the ReMida centre. The combination of making your own game and creating your own characters was very attractive to the informants:

> *R: Do you consider what you learned in the workshop as an alternative for video games?*
> *I2: Eahm yeah, I prefer making things than actually playing them, and animations too*

> *I5: Yes, you can do that because then you can make something and you can make your own movie...*
> *R: You like it because it is creative?*
> *I5: Yes*

> *I9: I did not know what Scratch was before I participated in the workshop, and when I got to try it, it was quite amusing, I thought it would be boring but instead it was quite amusing*
> *R: Do you find you learned an alternative to video games at the workshop?*
> *I9: Yes, I could imagine using Scratch instead of a video game (20)*

> *R: Do you find you learned an alternative to video games at the workshop?*
> *I11: Yes, and it is much more instructive to create something than just to sit and do something pointless (21)*

What jumps out in the answers of the informants is that they all appreciated the creative part of the workshop. Compared to a shop bought ready-to-play computer game the children liked to create the game and its characters at the workshop and preferred that to 'just' playing with a video game.

Straightforward question

When I was almost at the end of interviewing the children at the second school, the thought struck me that I had not directly asked the children whether they thought that the workshop's three long term goals were accomplished. I had been so focussed in finding the answers to this question through analysis, that I almost forgot to ask for their own opinion. I decided to deviate from the interview guide, as semi structured interview allows for additional questions when more in depth information is required, and posed the last two informants the direct question: *Do you find that the workshop's three long term goals have been reached?* Both informants had clear and positive answers:

> *I10: Yes, and are they not achieved in full, then I believe they are certainly improved.*
> *At least for me they have.(22)*

> *I11: Eeh.., yes. It has in any case strengthened my interest in arts, and that there are*
> *alternatives for computer games (23)*

This question was asked at the end of the interview after the informants learned about the workshop's long term objectives. Both the children whom were asked this question were considerably positive in their answer, and thought the workshop experience had had a positive effect on strengthening their interest in art en science and introduced them to a viable alternative to computer games.

The purpose of this discussion chapter is to relate the analytical findings to the theoretical framework in order to generate new insights. How to interpret and understand the results of the analysis? The outcome of the data analysis is put into perspective against the framework of theories identified in the process. As mentioned earlier, in the method chapter, the framework offered by the Grounded Theory approach generates insight, facilitates identification of different patterns and highlights differences and similarities in the data. By applying the theoretical framework to the results, internal relationships among the observed facts are revealed.

Contextual issues

In the course of the project I identified some particular conditions that initially raised concern. L*anguage* and *terminology* were two main contextual factors that could potentially influence the results of the research.. As visualised in fig.7, both these factors could affect the children's learning experience as well as the research.
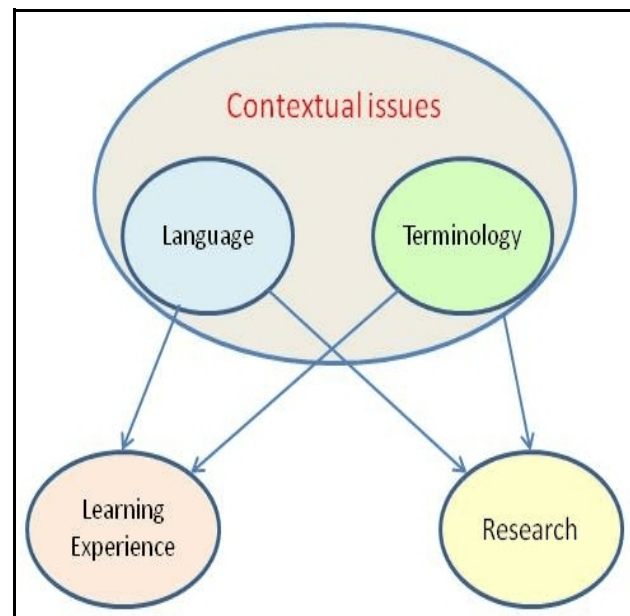

Figure 7: Contextual issues

Learning experience

The language of instruction at the respective workshops was 1) English and 2) Norwegian with English assistance. As none of the workshop students were English native speakers, this situation could potentially have influenced their experience in a negative way. However, feedback about this situation was not able to confirm this. According to one of the informants, it was a bit *embarrassing* not to be able to understand each other instantly, but criticism didn't extend beyond that. A workshop setting is a place where participants learn by doing. The words *art* and *science* (realfag) were mainly used in the written description of the course and only proved to be insufficiently defined in the research process. The learning experience was valued as being very interesting and different from a usual school day. Overall, informants

were positive and enthusiastic about their learning experience at the K+K=K workshop. Despite some confusion regarding certain terms and their exact content, this seems to have little effect if any on the children's learning experience, as per their own feedback.

Research

Language and *terminology* used in the workshops and the project description have influenced the research as discussed in the previous chapter. It was a significant detail that one of workshops was instructed in English and the other in Norwegian. It turned out that a multi-lingual researcher, namely me, was an advantage. I have grown accustomed to switching between different languages (NO-EN-IT-NL) on a daily basis in different environments and settings, and not rarely even within a single conversation, therefore I am well aware of the fact that small nuances in wording/phrasing can make a big difference in message content, conveyance and perception[3]. With that background, I was keen to recognise and mostly preclude possible complications caused by language differences. I took a reflective approach to the preparation of the interview guide, the interviews, analysis of data and interpretation etc. all the time challenging my habitual perspectives and being on a high level of alertness. Special attention was given to this matter in the research process, and as no other feedback than from I7 was received on this matter, it seems plausible to assume that language and terminology had no significant effect on neither the students' learning experience nor the research in general.

However, it is fair to say the research would have benefited from a better defined terminology in the project description. Unequivocal terms contributed to unequivocal conversations and one avoids concerns about meaning and interpretation. No particular theory was associated with the language/terminology issues. Theories about these topics origin in other disciplines as eg. second language studies and translation studies and are not part of the media, communication and information technology curriculum.

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[3]   The recent movie 'Lost in translation' (2003;www.imdb.com/title/tt0335266) and in particular the book 'Broken English spoken perfectly' (Stewart Clark 2009?, Frifant Forlag, www.englishmatters.no) demonstrate the issue is well known among common public,

Key themes I: What do the children say?

Knowledge is power

The children were not conscious about the link between the three long term goals summarized in the project description and the workshop. A thought may root when offered as information and the receiver of the thought is made aware of it. Thus, in this case it would have been wise *to plant a seed in the workshop participant's minds[4]*. An introduction of the three goals in advance of the workshop would have created a framework of meaning and purpose in which the children could have placed their experiences and reinforce the framework. By providing information the participants would have more specific expectations which would have shaped and enhanced their experiences. Some of the effects of inadequate/insufficient information about the workshop and its goals are for one a negative effect on the student's interest and consequently on the number of participants. As this was a school activity all students participated and the insufficient information had no consequences. Another effect of lack of information was that it affected the effect of the course. As the goals of the project were not conveyed to the participants, the workshop experiences were not recognised as activities that promote art, science and alternative use of computers. The students had an exciting day with interesting and new activities, however, the informants did not perceive these activities as a promotion of the project's three objectives. The workshop was taken at face value and the underlying purpose not perceived.

In the project development and planning phase a conscious choice was made to use a combination of art (creativity) and science (programming language Scratch) embedded in a workshop setting. Together this combination can be considered a medium. Media theory is interested in the influence of a medium independent of their content. The medium not only transmits, but also colours the message. According to McLuhan the decisive factor is not the content but the medium. The long term goals of the K+K=K workshops are defined as follows: to strengthen the participants' interest in 1) art and 2) science/programming and to introduce a creative alternative for computer games. Whilst analysing data I noticed that the medium (= art + science + workshop) match the project goals (= art + science + alternatives to computer games). In other words the goals of the K+K=K workshops were included in the

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[4]   Napoleon Hill (1883-1970): "Think twice before you speak, because your words and influence will plant the seed of either success or failure in the mind of another."

medium and thus the message. By making a deliberate and aware choice for the combination of creativity+programming+workshop, the goals are already conveyed to the participant.

For most people it is a challenge to see past the content of a message and perceive the meaning and influence of the medium. The participants of the workshops were children in the age of 11-13, thus it seems reasonable to assume that without any hint or help it was too complicated for them to see past the content of the course (creating characters, writing a storyline, and using Scratch) and understand the significance of the medium (being the combination of creativity and programming in a workshop setting). At best the workshop can be a subliminal message, affecting the participants' mind and perception without them being aware of it. If the workshop's goals and objectives and the way (= with which tools) those were going to be reached were introduced to the children in advance, this information would have created insight and understanding and thus a favourable setting for accomplishment of the goals.

Just do it!: Workshops

At the K+K=K workshops the students engaged in a learning experience by creatively expressing themselves. The workshop offered a creative learning experience by combining art and science in a workshop setting. The students' accounts of their experiences at the course all describe a felicitous and creative environment, just the favourable context Papert describes in his constructionism theory. The participants make objects using recycled materials and use these as sprites after uploading pictures of the objects in the Scratch software program. A presentation of their creations, ie. the characters and the interactive stories is given at the workshop where after the animation is published on the Scratch website.

The children engage in a creative learning process by creating their project. When the project is completed the child takes a step back and goes through an additional evaluative learning process preparing a presentation and explaining his/her project to all present at the workshop. The children see immediate results of their efforts. The importance of an audience becomes evident when the projects are presented to their audience at the workshop and published on the Scratch website. The students take pride in their creations, the perception of themselves is more positive, in interview informants remarked they did not think they had it in them to make/do what they did at the workshop. The workshop was described as a positive and

44

creative learning experience in which learning was relatively easy, interesting and pleasant. This coincides with findings published previously about workshops using Scratch software, eg. Tangney et al. 2010, Cheung et al. 2009, Price and Rogers 2004, Wilson and Moffat 2010.

Troubleshooting: workshop implementation

The informants pointed out several issues that were reason for irritation and caused some negative moments in the experience of the workshop. Among the situations mentioned by several informants was the sometimes long **waiting** between successive sessions. As the two K+K=K workshops were the first to be organised, it was not possible to use examples from preceding workshops. In retrospect, minor changes to the workshop program and session order, to reduce unnecessary waiting in between are actually rather easy to implement. The observation report describes the following situation: when the groups were finished creating their character, pictures had to be taken, edited and uploaded in the group's Scratch program. This was the task of the instructor/creative artist and the children had to wait until this job was done, as there was only one person for this job, the waiting time could be long. This situation was easily avoided by scheduling this task after hours. Next morning, the children would find the sprites already uploaded in their program and could start working on the next session. Another situation was that the groups did not work all at the same pace and had to wait for each other to proceed to the next session. To avoid this the children could be given a time limit for each session, the assistants would monitoring progress of each group and assist the group(s) behind schedule.

Another matter expressed by the children is the desire to be better prepared and receive more elaborate **instructions** for Scratch in advance. Compared to learning methods used at most schools, workshops apply a different way of learning. The informants' wish for more thorough instructions in advance suggests a preference to start a job informed and prepared, this is in contrast to the more explorative fashion of *learning by doing* applied in workshops, which is a process of trial and error (see example of a process of trial and error in fig 8, next page). Papert's constructionist theory promotes learning by doing. The ordinary school system is not used to this method, instead books and teachers provide information and instruction. To some people the 'learning by doing', or trial and error method can feel uncomfortable. To these persons it feels unpleasant to make mistakes, and so they prefer to avoid making them. In

45

contrast to suggestions made in Papert's constuctionist theory, one could consider offering more information and instructions in advance in order to reduce the amount of subject-matter that has to be learned by trial and error. By providing just enough information to get started and feel 'safe and comfortable' enough, participants feel confident to proceed by trial and error.

Figure 8: Trial and error (source R. Stoker)

A third issue that came up during the interviews was failure of **technical equipment**, invoking irritation and putting the participants' patience to the test. Computers jammed, crashed and/or had to be re-booted, and the children were obliged to wait until they were up and running again, which was perceived as undesirable and tedious, distracting from an otherwise positive experience at the workshops. Negative experiences influence the perception of the workshop. When the medium is in someway negatively affected, then the message suffers in a negative way from this. Also in the constructivism perspective, a negative moment has a negative effect on the experience and the advantages of experiential learning are lost or diminished. A solution to create a more *'felicitous'* or *'happy and carefree'* setting would be to make more computers available in order to create an ideal constructionist setting. An idea would be to allow participants that possess their own laptop to bring it to the workshop. That would also favour the domestication process, because the Scratch program would be downloaded straight in to the children's own laptops which are part of their everyday life.

After the workshop: domestication

To investigate whether or not a domestication process was initiated I asked the informants a few questions relating to the four stages of domestication: appropriation, objectification, incorporation and conversion. In the stage of appropriation a new technology has to be

46

acquired. It is bought and/or made available in the everyday life of the user, e.g. Scratch is introduced to the students at the K+K=K workshop. The next stage is *objectification,* the new technology is placed, interpreted and constructed in the physical, symbolic and mental environment of the home and/or school. This stage proved to be problematic for a few of the students. Due to problems downloading Scratch at home (or even finding the program on the internet), some informants never completed this stage. The next stage is the *incorporation* of the technology, indicating full integration in daily life, including adaptation of pre-existing daily routines or construction of entirely new ones to accommodate the new technology. Although a few students indicated their interest in using Scratch at home, the few that succeeded in downloading and using the program, did not use it anymore at the time of the interview. The last and final stage in the process of domestication is the *conversion* of the new object. In this stage, new users convey the new product to their environment, eg. by physically showing the new technology to friends and family, or symbolically by for example mentioning the new object in conversation (Aune 1996). Also this stage is only partially accomplished. A few informants mention having spoken about Scratch and the workshop at home with family and with friends.

Although the majority of the workshop participants raised their hands when they were asked whether they thought they would continue using Scratch, the informants did not use Scratch anymore at the time of the interviews . A measure to improve accessibility to the Scratch software could be to eg. inform the children. At the end of the workshop ample information about the program and the web address of the site where the free Scratch software can be downloaded should have been made available to the participants and their school teacher. This would have facilitated the domestication process. Also the earlier mentioned option of the children taking their own laptop to the workshop and download the software on to it, is a measure that would have jumpstarted the use of Scratch at home and secure the start of a domestication process.

Key themes II: The long term goals
The informants were asked questions to assess whether their experience at the workshop has increased the participants' interest in art/creativity and science/programming as well as introduce an alternative to computer games.

Science and programming

Some informants had difficulty recognizing **science and programming** in the workshop experience. The following two main reasons for this were revealed in analysis:

- the long term goals were left unspecified, and

- it was unclear to participants what the term *science/realfag* comprises.

The program used at the workshop is a programming language software; the children actively worked with the program and learned how to use it. The medium, consisting of the combination of *creativity and Scratch in a workshop context*, was the message that subconsciously had an effect on the children's perspectives. To make the children aware of this effect, it would suffice to arrange a brief introduction prior to the workshop, outlining eg. project, long-term goals, workshop program and use of the open source software program Scratch to the participants. This way they would gain insight in the purpose of the K+K=K workshop and it would be easier for them to recognize certain links between workshop content and intended purposes.

Creativity

It appears the children were more focussed on the **creative** part, or that at least it was the activity they best remember. It was easy for the informants to recognize the connection between the workshop and their increased interest in art. The children learned that art has different dimensions and can be seen from different perspectives. The workshop experience broadened the participants' understanding of the term art; one informant eloquently described that he/she now sees there are different *'versions'* of art. Compared to the term 'science', the term 'art' caused less confusion. The children had less, or no difficulty understanding the connection between the workshop experience and art. Regarding the long term goal of *increasing the children's interest in art* the constructionist perspective of *learning by doing in a felicitous context* was a good framework to reach the objective. The choice of organizing a workshop for the children in order to achieve the long term objectives was very successful.

An alternative

The final long term goal of the project is to provide a **creative alternative for the use of digital media**. To make the term *digital media* more comprehensible to the informants, I chose to give them a concrete example by using *video games* instead. In hindsight it would

have made more sense to compare it to the (at this moment) very popular Facebook, as I got the impression that video games were possibly not so popular amongst this group of informants. The creative side of the workshop and Scratch was very much appreciated and mentioned as one of the reasons why they could see Scratch as an alternative to video games. The usefulness of creating something versus passively playing a ready-made computer game appealed to the informants. Creativity and usefulness are qualities that predominate the K+K=K workshop. Again the constructivist approach proved to be an appropriate learning method to reach the project's objectives.

50

The goal of this qualitative research was to assess whether the three long term goals of the K+K=K workshops were achieved. The workshops I focussed upon in this research were organised for two school classes with children between 11 and 13 years old, and each course lasted for two days. At the workshop the participants had the possibility to explore and experiment with a variety of materials as well as with the programming language software Scratch and had the opportunity to develop ideas collaboratively. In groups the children wrote a story, created the two main characters with recycled materials. These characters were then photographed and the images were downloaded to serve as sprites in the Scratch program. The children then used the programming language to create their interactive story in Scratch. The films were then presented in a theme room the children rigged. The icing on the cake was the uploading of the projects on the Scratch website, sharing them with the global audience.

The data collection method chosen for this research was one-on-one semi structured interviews. The variety of responses collected in the interviews has provided broad insight into different areas of children's experiences. The multiplicity of viewpoints the interviews yielded were very useful as those provided insight and depth in the children's experiences, perspectives and opinions, and strengthened this qualitative research. The informants' responses were not intended as 'typical' or 'characteristic' examples, for reliability purposes.

The modus operandi in this research was based upon Grounded theory method. During the process of preparing the research, data collection, analysing and interpreting, three main theories were identified: Papert's Constructionism, McLuhan's Media theory and Domestication theory. These three theories provided better insight in the matter and offered new perspectives on the understanding and interpretation of the primary and secondary data. Overall conclusion of this research indicate that the K+K=K project was successful and the long term objectives have been either completely or partially achieved. Although the participants were very enthusiastic and positive about their workshop experience, they also managed to offer constructive criticism and point out weaknesses in both the workshop program and implementation of it. Not only were analytical results used to 1) assess the progress of the projects long term objectives, in addition they 2) provided insight in and

understanding of contextual issues and 3) revealed areas of improvement for the set up of the workshops. The critical stance of both the researcher and the informants yielded results that can be used to improve future workshops, facilitate and improve future research on similar workshops and possibly inspire a change in the standard school curriculum regarding creative and computer/programming activities.

The findings are of direct benefit to future participants of the workshops, as the results of the research will contribute to improving and optimizing the workshop experience and develop a workshop that meets the children's best interests as well as further increase success rates in achieving the three long term goals. Furthermore, the findings of the study will be significant to workshop organisers and schoolteachers as the results indicate what the children appreciate and what they label *negative issues*. This study will in addition not only boost initiatives to develop additional learning activities in and outside school, but also offer suggestions for how to make these activities an enjoyable experience for the children. Informal learning settings as the K+K=K workshops have proven to be an ideal setting to introduce young people to different perspectives on the use of a personal computer and in addition boost their passions for art and computer programming.

7 REFERENCES

Argyle, M , & Dean, J (1965): *Eye-Contact, Distance & Affiliation*, in *Sociometry*, Vol 28-3 (Sep 1965), American Sociological Association, pp289-304

Aristotle (2007): *Moral virtue*, in: *The Nicomachean ethics*, translated by Ross, WD, Forgotten Books, pp28-48

Aune, M (1996): *The computer in everyday life: Patterns of domestication of a new technology*, in Lie, M and Sørensen, KH: *Making Technology Our Own? Domesticating Technology into Everyday Life*, Scandinavian University Press, Oslo, pp91-120

Aune, M (1998): *Nøktern eller nytende; energiforbruk og hverdagsliv i norske husholdninger*, STS-report 34, Senter for teknologi og samfunn, NTNU, Trondheim, p249

Berker, T, & Levold, N (2007): *Moralske praksiser i forbindelse med tung internettbruk*, in Levold, N & Spilker, HS: *Kommunikasjonssamfunnet: moral, praksis og digital teknologi*, Universitetsforlaget, Oslo, p35-49

Bernard, HR (2006):*Research methods in cultural anthropology*, 4th ed., Altamira Press, Lanham, p824

Croteau, D, & Hoynes, W (2003): *Media technology and social change*, in: *Media society; industries, images and audiences*, (3rd edition), Sage Publications Inc., pp299-313

Dey, I (2007): *Grounded theory* , in Seale, C, Gobo, G, Gubrium, JF and Silverman, D, (eds): *Qualitative research practice*, Sage, London, pp80-93

Donnay, JDH (1995): *Veritas Vos Liberabit; Code of Ethics in Scientific Work,* in *Canadian Mineralogist, Journal of the Mineralogical Association of Canada*, Vol.33/2, inside back cover

James, A, Jenks, C, &Prout, A (1998): *Theorizing childhood*, Polity Press, Cambridge, p247

Kvale, S (1997): *Det kvalitative forskningsintervju*, Ad Notam Gyldendal, Oslo, p236

Lie, M and Sørensen, KH (eds) (1996): *Making technologies our own? Domesticating technology into everyday life*, Scandinavian University Press, Oslo, Chapter 1, 4, 5

Lister, M, Dovey, J, Giddings, S, Grant, I, & Kelly, K (2003): *New media: Determining or determined?*, in Lister, M, Dovey, J, Giddings, S, Grant, I and Kelly, K: *New media: A critical introduction*, Routledge, London, pp72-96

May, T (2001): *Social research; Issues, methods and process,* Open University Press, Berkshire, UK, p258

McLuhan, M (1973): *The medium is the message*, in McLuhan, M: *Understanding media: the extensions of man*, Abacus edition, Sphere Books Ltd, London, pp15-30

Papert, S (1993): *Situating constructionism*, in Harel, I and Papert, S (eds): *Constructionism*, Ablex Publishing Corporation, New Jersey, pp1-11

Payne, G, & Payne, J (2004): *Key concepts in social research*, Sage Publications Ltd, London, p242

Price, S and Rogers, Y (2004): *Let's get physical: the learning benefits of interacting in digitally augmented physical spaces*, in *Computers & Education issue 43*, Elsevier, pp137–151

Rapley, T (2007): *Interviews*, in Seale, C, Gobo, G, Gubrium, JF and Silverman, D (eds): *Qualitative Research Practice*, Sage Publications, London, pp15-33

Scott, J (2000): *Children as respondents; the challenge for quantitative methods*, in Christensen, P and James, A: *Research with children, perspectives and practices*, Falmer Press, Oxon, pp98-119

Silverstone, R, Hirsch, E, & Morley, D (1992): *Information and communication technology and the moral economy of the household*, in Silverstone, R and Hirsch, R: *Consuming technologies; media and information in domestic spaces*, Routledge, London, pp15-32

Strauss, A, & Corbin, J (1998): *Basics of qualitative research, Techniques and procedures for developing Grounded Theory*, (2nd ed) Sage Publications, London, p312

Sørensen, KH (2007a): *Domestication; the enactment of technology*, in Berker, T, Hartman, M, Punie, Y and Ward, KJ (eds.) *Domestication of media and technologies*, Open University Press, Maidenhead, pp40-61

Sørensen, KH (2007b): *Et sosialt kompass? Mobiltelefonen i voksnes hverdagsliv*, in Levold, N & Spilker, HS: *Kommunikasjonssamfunnet: moral, praksis og digital teknologi*, Universitetsforlaget, Oslo, pp50-66

Tjora, A (2010): *Kvalitative forskningsmetoder i praksis*, Gyldendal Norsk Forlag AS, Oslo, p218

Van Dijk, J (2006): *The network society: Social aspects of new media*, 2nd edition, Sage Publications Ltd., London, United Kingdom, p292

Williams, R, Stewart, R, Slack, R (2005): *Social learning in technological innovation: Experimenting with information and communication technologies*, Edward Elgar Publishing Ltd., United Kingdom, Introduction and chapter 6

Online references

Ackerman, E (2001): *Piaget's Constructivism, Papert's Constructionism: What's the difference?*, in *Constructivism: Uses and perspectives in education*, vol 1 & 2, Conference proceedings, Geneva: Research centre in education/ cahier 8 / Sept 01, pp85-94, retrieved 08.03.2011 from *http://learning.media.mit.edu/content/publications/EA.Piaget%20_%20Papert.pdf*

Cheung, JCY, Ngai, G, Chan, SCF, & Lau, WWY (2009): *Filling the gap in programming instruction: a text-enhanced graphical programming environment for junior high students*, in ACM SIGCSE Bulletin, Vol 41/1, pp276-280 retrieved 01.05.2011 from *http://portal.acm.org/citation.cfm?doid=1539024.1508968*

Cicero, MT (46BC): *De optimo genere oratorum*, retrieved 23.02.2011 from www.thelatinlibrary.com/cicero/optgen.shtml

Harel, I (2003): *Building software beats using it: Fourth-graders at an inner-city school in Boston learn that it's more fun to build software themselves than it is to use software somebody else builds for them*, retrieved 26.03.2011 from http://www.mamamedia.com/areas/grownups/new/21_learning/building_software.html

Høyset, M, & Jaccheri, ML (2011): *Art and technology for young creators*, (submitted for publication) retrieved 13.05.2011 from http://artentnu.wordpress.com/

Leite de Oliveira, I, & Nasambu Wasike, S (2010): *Using Scratch to encourage children's creativity*, (Specialisation Report), retrieved 03.02.2011 from *http://prosjekt.idi.ntnu.no/sart/remida/SpecialisationReportRecentIveteSylvia-13.1 2.doc*

Morse, JM, Barrett, M, Mayan, M, Olson, K, & Spiers, J (2002): *Verification strategies for establishing reliability and validity in qualitative research*, International Journal of Qualitative Methods 1 (2) Spring 2002, University of Alberta, Canada, retrieved 14 .03.2011 from *www.ualberta.ca/~iiqm/backissues/1_2Final/pdf/morseetal.pdf*

NESH, The National Committee for Research Ethics in the Social Sciences and the Humanities in Norway (2006): *Guidelines for research ethics in the social sciences,*

law and the humanities, retrieved 10.01.2011 from www.etikkom.no/English/NESH/guidelines/

NSD, Norwegian Social Science Data Services, retrieved 10.01.2011 from *www.nsd.uib.no/nsd/english/index.html*

Ortolan, R (2010): *Collaborative artwork creations using sharing activities and open source software tools*, (Ntnu Specialisation Report), retrieved 10.01.2011 from *http://artentnu.files.wordpress.com/2011/03/report.pdf*

Papert, S (1980): *Constructionism vs. instructionism*, speech by video to a conference of educators in Japan, retrieved 25.03.2011 from *www.papert.org/articles/const_inst/const_inst1.html*

Scratch programming language program, Massachusetts Institute of Technology, retrieved 15.01.2011 from *http://scratch.mit.edu/*

Tangney, B, Oldham, E, Conneely, C, Barrett, S, & Lawlor, J (2010): *Pedagogy and processes for a computer programming outreach workshop—The bridge to college model*, in IEEE Transactions on Education, Vol 53/1, pp53-60, retrieved 01.05.2011 from *http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5232815&tag=1*

Wilson, A and Moffat, DC (2010): *Evaluating Scratch to introduce younger schoolchildren to programming*, retrieved 16.03.2011 from http://www.ppig.org/papers/22nd-Teach-6.pdf

Wordnet; a lexical database for English, Princeton University NJ, retrieved 13.04.2011 from *http://wordnet.princeton.edu/*

Figures

Figure 1: *Progress in semi structured interview; the funnel approach*, source: Qualtrics University, retrieved 16.04.2011 from *www.qualtrics.com/university/top-ten-rules-for-writing-surveys/*

Figure 2: *Sampling process*, source Bureau of Energy Efficiency India retrieved 18.02.2011 from *www.bee-dsm.in/Tools_1.aspx*

Figure 3: *Selection of sampling technique*, source Bureau of Energy Efficiency India retrieved 18.02.2011 from *www.bee-dsm.in/Tools_1.aspx*

Figure 4: *Kolb's experiential learning model*, source: The Science Education Resource Centre (SERC), retrieved 26.03.2011 from *http://serc.carleton.edu*

56

Figure 5: *McLuhan's Tetrad: Laws of media model*, source Parsons The New School for Design, New York, USA, retrieved 03.02.2011 from *http://a.parsons.edu/~cjeong/majorstudio/images/interaction52.png*

Figure 6: *Screenshot of one of the K+K=K projects* retrieved 29.04.2011 from *http://scratch.mit.edu/projects/artentnu2009/1483502*

Figure 7: *Contextual issues*, source Proto, R

Figure 8: *Trial and error*, source Stoker, R, retrieved 02.05.2011 from *www.cartoonstock.com*

INTERVIEW GUIDE K+K+=K WORKSHOPS

A: ABOUT THE INFORMANT:

1. Can you tell me your name and age?

2. How would you describe your interest in arts/science? How so?

3. How many hours do you spend at the computer on a regular weekday/weekends?

4. What do use your computer for, what do you like best? What does interest you most?

5. Would you consider yourself to be a creative person? How so?

B: ABOUT THE K+K=K WORKSHOP:

1. How did you hear about the workshop?

2. What kind of information did you receive about the workshop and its objectives?

3. Did this information raise your interest in the workshop? Did you look forward to attending the workshop?

4. Were you free to decide yourself whether or not you wanted to participate? Had you been free to decide, would you have participated? Did the workshop seem interesting to you?

5. Was it important for you to attend the workshop together with a friend?

6. What did you learn?

7. What was easy and what was difficult?

8. What parts did you like, what did you not like?

9. What did you think of the duration of the workshop?

10. If you could suggest changes for the workshop, what would those be?

C: ABOUT ARTS (KUNSTFAG):

One of the long term goals of the workshop is to encourage students' interest in arts.

1. What is arts to you? Do you use/see/experience art in daily life?

2. In what way did the workshop have to do with arts?

3. Did the workshop increase your knowledge about arts, or make you more interested in arts and creativity involved

4. Would you say the workshop had any influence (positive/negative) on your opinion about arts?

D: ABOUT COMPUTER SCIENCE/PROGRAMMING (REALFAG):

Another goal of the workshop is to encourage students' interest in science.

1. What is science to you? Do you use/see/experience science in daily life?

2. In what way did the workshop have to do with science and computer programming?

3. Did the workshop increase your knowledge about science and computer programming, or did it raise your interest in it?

4. Would you say the workshop had any influence (positive/negative) on your opinion about science and computer programming?

E: ABOUT VIDEO GAMES:

The last long term perspective of the workshop is to increase awareness of creative use of digital media, as an alternative for video games.

1. Do you play video games? Where? How often? (Hours a day / week)

2. Did the workshop increase your knowledge about alternative use of a computer?(alternative to games)

3. Did it raise your interest in finding other programs online?

4. Would you say the workshop had any influence (positive/negative) on your opinion about free computer programs?

5. Do you consider what you learned in the workshop as an alternative for video games? In what way?

F: EVALUATION OF THE K+K=K WORKSHOP:

How did you perceive the workshop? What was good/bad/mediocre experience?

1. Did you like working in a group? What are the advantages/disadvantages of working in a group?

2. Did you use Scratch or any of the other tools you got familiar with at the workshop later at home?

3. Which of the things you have learned do you consider most valuable?

4. Do you find a workshop a good way to learn something in general?

5. Did you speak to others about the workshop? What did you tell them?

6. Do you have any suggestions about how the workshop could be improved? In achieving its three goals?

INTERVJU GUIDE K + K + = K VERKSTEDET

A: OM INFORMANTEN:

1. Hva heter du og hvor gammel er du?

2. Hvordan vil du beskrive din interesse i kunstfag og realfag? Vennligst grei ut.

3. Hvor mange timer bruker du datamaskinen på en vanlig ukedag / helg?

4. Hva bruker du datamaskinen til, hva liker du best? Hva interesserer deg mest?

5. Oppfatter du deg selv som en kreativ person? Hvordan det?

B: Om K + K = K verkstedet:

1. Hvordan fikk du høre om verkstedet?

2. Hva slags opplysninger fikk du om verkstedet og dets mål?

3. Har denne informasjon vekket din interesse i verkstedet? Så du frem til å delta i verkstedet?

4. Fikk du bestemme selv om du ønsket å delta? Hadde du vært fri til å bestemme, ville du allikevel ha deltatt? Virket verkstedet interessant for deg?

5. Var det viktig for deg å delta på verkstedet sammen med venner?

6. Hva har du lært?

7. Hva var lett / hva var vanskelig?

8. Hvilke deler likte du, hvilke likte du ikke?

9. Hva synes du om varigheten av verkstedet?

10. Hvis du fikk foreslå endringer for verkstedet, hva ville de være?

C: Om Kunstfag (Art):

Ett av de langsiktige mål for verkstedet er å øke elevenes interesse i kunstfag.

1. Hva er kunst og kunstfag til deg? Ser/bruker/opplever du kunst i hverdagen?

2. På hvilken måte har verkstedet noe å gjøre med kunst og kunstfag?

3. Har verkstedet økt ditt kunnskap om kunst og kunstfag, og har det økt din interesse for det?

4. Synes du at verkstedet har påvirket din mening om kunst og kunstfag?(positiv / negativ)

D: Om Realfag (Science):

Verkstedets annet langsiktige mål er å stimulere elevenes interesse i realfag.

1. Hva er realfag til deg? Hvordan ser/bruker/opplever du realfag i hverdagen?

2. På hvilken måte har verkstedet noe å gjøre med realfag?

3. Har verkstedet økt ditt kunnskap om realfag, og har det økt din interesse i det?

4. Synes du at verkstedet har påvirket din mening om realfag?(positiv / negativ)

E: Om Video spill:

Verkstedets siste langsiktige mål er å øke bevisstheten om kreativ bruk av digitale medier (pc), som et alternativ for dataspill.

1. Bruker du/liker du å spille dataspill? Hvor? Hvor ofte? (Timer/dag i uka)

2. Har verkstedet økt ditt kunnskap om alternativ bruk av datamaskin? (som alternativ til spill)

3. Har det økt din interesse for å finne andre (gratis) programmer/spill på nettet?

4. Vil du si at verkstedet har påvirket din mening om gratis dataprogrammer?

5. Syns du at det du lærte på verkstedet er et alternativ for video spill? Ja/nei og på hvilken måte?

F: EVALUERING AV K + K = K VERKSTEDET:

1. Hvordan fikk du høre om verkstedet? Hva var en bra/dårlig opplevelse?

2. Liker du å jobbe i en gruppe? Hva er fordeler / ulemper ved å jobbe i en gruppe?

3. Har du brukt Scratch programmet eller noe av det du lærte på verksted hjemme siden?

4. Av det du har lært på verkstedet, hva anser du som mest verdifull?

5. Synes du et verksted er en god måte å lære noe?

6. Har du snakket med / fortalt andre om verkstedet? Hva sa du til dem?

7. Har du forslag om hvordan verkstedet kunne gjøres bedre? (I å oppnå sine tre målsetningene?)

Appendix 2: Interview quotations in Norwegian

1.   R: Har du forslag om hvordan verkstedet kunne gjøres bedre?

I7: Jo da vi hadd en-to stykker som kunn Norsk, resten kunn Engelsk, og det var resten som hjalp oss mest av alt og noen i klassen kan jo ikke Engelsk så godt. Så da var det veldig vanskelig for dem da. Så noen dagar så for jo en i klassen min å snakke Norsk til dæm, og veldig læng, og dæm sto og ser og ser og ser...å så skjønner hu jo at dem ikke kan Norsk! Hehe, så æ har jo stått og bable i vei til dæm da... til slutt så sier de..'I can't speak Norwegian' og da er det veldig flaut da, men burde vært at dem også kunne lært Norsk, det ville vært en fordel.

2.   R: Hva er realfag til deg?

I7: Æ vet ikke helt ka realfag è...er det sånn realitet eller?

R: Nei, det er science på Engelsk

I7: Realfag for meg det er vitenskap, verdensrom og sånne ting. Hvis vi skal tenk om verksted da og ting som interesser meg, vi hadd litt om det da, på en måte fordi at vi skul lær oss å få figuren vårres i Scratch. Så komme ut i verdensrommet, det var en gruppe som hadd det, så vi lært en del ja...

3.   R: Hvordan vil du beskrive din interesse i kunstfag og realfag?

I8: Realfag?

R: Ja, bruker dere ikke ordet? Det er science på Engelsk.

I8: Forskning?

4.   R: Hva er realfag til deg?

I8: Realfag? Jeg tror det er sånn vanlig Norsk, matte, Engelsk sånn vanlig fag. Tror jeg da... æ vet egentlig ikke ka de è egentlig. Det ordet det har jeg ikke brukt så mye.

5.   R: På hvilken måte har verkstedet noe å gjøre med realfag?

I9: Eh, selvfølgelig var Norsk og Engelsk der, for de studentan snakket Engelsk, så der kjem jo en del realfag for det var Norsk/Engels og data og sånt med...så æ vil si masse realfag.

6.   R: Synes du et verksted er en god måte å lære noe?

I8: Ja, det var en veldig god måte o lær kreativitet på, ja. Og når man først sitt og lag ting, det er artiger enn å få skriv i bok.

7. R: Synes du et verksted er en god måte å lære noe?

    I9: Ja, det synes jeg, fordi det vi fikk gjøre det var masse læring i det, det var ikke liksom bare lek og gøy og sånt. Det var masse læring, og vi var nødt å følge med for å klare det liksom.

8. R: Av det du har lært på verkstedet, hva anser du som mest verdifulle?

    I9: Eh, æ vet ikke. At man fikk se filmen helt ferdig, at vi fikk se resultatet

9. R: Ble det sagt noe om verkstedets mål, og hvorfor dere skulle på verkstedet?

    I10: Nei

10. R: Hvordan fikk du høre om verkstedet?

    I8: Det var læreren som ga me beskjed at vi skul på ReMida, vi fikk jo litt informasjon om ka det innebære og ka vi skul gjør på ReMida og sånn. Æ husk itj...det begynner å bli en liten stund sia nå, men.. vi fikk jo litt sånn informasjon om ka vi skulla gjør ja, og sånne ting.

11. R: Har du forslag om hvordan verkstedet kunne gjøres bedre?

    I10: Kanskje som jeg sa istad, litt mer hjelp te å komme i gang med Scratch, litt mer informasjon på forhånd.

12. I8: Nei, æ søkt det opp på Google men æ fant det itj.

13. I11: Som sagt, æ hadde lyst til å gjør det. Æ har bare prøvd å innstaller det hjem og her på skolen, men jeg fikk det ikke til.

14. I11: Nei, jeg egentlig ikke fortalt så mange om det. Hjemme brydd dæm egentlig ikke så veldig mye.

15. I7: Jaaah, har jo fortalt vennan min og foreldran min og sånn, dem sa at det var veldig bra og foreldran mine sa at det var veldig bra men vennan min... æ trur det è lurt at dem opplever det, enn at vi for teller det

16. I10: Ja, jeg har snakket med andre skoler og sånn. Jeg har sagt at det var bra, og har anbefalt dem det og så har jeg anbefalt folk å laste ned Scratch.

17. I8: Når jeg hører 'Kunst', da tenker jeg... det første jeg tenker når jeg hører ordet 'Kunst' så tenker jeg et maleri. Og til meg har kunst blitt litt artigere etter vi har vært der, fordi at når vi kunne lage derre folka og sånt det er kunst. Det er en artig variant av kunst synes jeg, i forhold til andre ting.

18. I11: Æ syns det er mye mer interessant og før så tenkt jeg et skulptur eller et maleri, nå har jeg tenkt at det er mye mer enn det, liksom kunst è det du kaller kunst. Det er liksom, kunst ska vær alt... det varier fra person til person

    R: På hvilken måte har verkstedet noe å gjøre med kunst og kunstfag?

    I11: Nei, vi lære jo å skap nokka, både når man lager skulptura og når man lage det derre video, siden data er også med å skap nokka.

    R: Har verkstedet økt ditt kunnskap om kunst og kunstfag, og har det økt din interesse for det?

    I11: Ja, ja no synes jeg kunst vært så mye mer interessant, jeg syns det mye morsommere å sje på ting å sje forskjellige vinklinga av ting.

19. R: På hvilken måte har verkstedet noe å gjøre med realfag?

    I7: Jeg vil ikke si at verkstedet hadd noe med realfag å gjør for at det verkstedet hadd noe med kunst å gjør og det er to vid forskjellige ting

    R: Enn den Scratch delen da? Fordi det har programmering og komputer...

    I7: Ja, det hadd jo det, litt når det gjeld realfager...

20. I9: Ja, æ visste ikke hva Scratch var før jeg kom til verstedet da, og når jeg fikk prøv det så var det ganske artig egentli, æ trodd det var kjedelig og sånt men det var ganske artig egentlig

    R: Syns du at det du lærte på verkstedet er et alternativ for video spill? Ja/nei og på hvilken måte?

    I9: Ja, det kan jeg tenk mæ å bruk Scratch istedenfor video spill

21. R: Syns du at det du lærte på verkstedet er et alternativ for video spill? Ja/nei og på hvilken måte?

    I11: Ja, og så er det mye mer lærerikt å ta å skap nokka enn jo bare sitt å gjør ting som ikke er no vits I.

22. I10:Ja... om ikke helt oppnådd, så er de i hvert fall bedre tror jeg. I hvert fall til meg.

23. I11: Eeh, ja, hvertfall å styrke interesse i Kunstfag, og at det er et alternativ for dataspill.