The perceptions of self-assessment in basic education in craft, design and technology

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ABSTRACT

This article examines the perceptions and occurrence of self-assessment of sixth and ninth grade, 12 and 16 years old students (N = 508) and the different ways that self-assessment was carried out during a holistic craft process. The study was conducted in the context of the Finnish comprehensive education Basic Education curricula of 2004 and 2014. The goal of self-assessment is to develop students' learning process. Self-assessment is an integral part of a holistic design and making process in craft, design and technology (CDT) education. Self-assessment can be implemented through evidence based, reinforcing, reflective and pragmatic self-assessment. Self-assessment is a part of design, planning and manufacturing a product. It can occur in every step of the process, also as the final assessment of the work.

The data was collected in town schools in comprehensive primary and secondary education in Finland in 2017. The summation-based analysis showed that there were statistically significant differences between student groups. The ninth grade students who did not study CDT as an optional subject expressed the most negative perceptions in all areas of self-assessment. Getting used to self-assessment was clearly associated with the students' positive perceptions towards self-assessment as a part of a learning process. The data from open-ended questions were in line with the result of the analysis.

Although the data of the study was collected in a geographically limited area, it gives an idea how students see self-assessment as a part of their learning. The results suggest the importance for students to acquire self-assessment skills not only as an important stage of their learning process but also from the positive learning experience point of view.

Key words: self-assessment, Craft, design and technology education, primary and secondary education, holistic craft process

Introduction

Self-assessment is a part of a holistic craft process. Self-assessment in a holistic craft process has been found to be linked to students' positive or negative attitudes towards self-assessment in general (Saarnilahti, Lindfors & Iiskala 2019). Craft, Design and Technology education (CDT) is a subject, that is taught to everybody in Finnish comprehensive education (grades 1-9, 7-16 years old students). A common subject continues to the end of the seventh grade. Furthermore, CDT can be chosen as an optional subject for grades eight and/ or nine. (Finnish National Agency for Education.)

Both self-assessment and intentional learning are strongly represented in the latest curricula of the Finnish comprehensive education (FNAE, 2014). Self-assessment together with an intentional craft process helps students to achieve their learning goals by offering a chance to reflect on their holistic craft process. Intentional learning can be understood as students' pursuit to understand the study goals in CDT (Vosniadou 2003).

The holistic craft process is divided into discrete stages including design, planning, manufacturing the product/solution and final assessment. The process is ongoing and the maker of the product can go back and forth to any step of the process at any given time (Lepistö 2004). Holistic craft process is also meant to educate students to understand the relations between these steps (Rönkkö 2011). Positive attitudes towards CDT enhances students' technical skills by deepening students' knowledge of the subject (Hilmola & Lindfors 2017).

Self-assessment is an important method of formative assessment. It gives students an opportunity to assess the quality of not only their work, but also their time management skills, goal setting and task performance. (Andrade & Valtcheva 2009.) Self-assessment differs from reflection. Self-assessment is anticipating and reflection is reactive. They both have a different purpose in a learning process. Reflection is used to find strengths and weaknesses of something that is already done. It can be directed to the work process, final product or students planning skills for example. Self-assessment on the other hand aims to make a student a better learner and it is more flexible. Self-assessment can be done at any part of the process. (Desjarlais & Smith 2011; Burke, Lawrence, El-Sayed & Apple 2009.) In this study self-assessment is divided into four different categories as follows: evidence based, reinforcing, reflective and pragmatic self-assessment (Shaw 1999; Kivipelto 2008). The decentralization of self-assessment into different categories helps to form a general overview of a target to be assessed (Clarke 2006). This model comes from evaluation practices in social work quality assessment, but it can also be linked to the Finnish curriculum of comprehensive education (FNAE, 2014) where aspects of evaluation are *learning, working* and *behaviour* (FNAE, 2014).

Evidence based self-evaluation links to intentional learning. It is relatively easy to see what works and what does not. Reaching to advance set learning target will be estimated after the work is completed. *Reinforcing* self-assessment brings out the student's successes and concentrates on the usefulness of the self-assessment in the context of learning. *Reflective* self-assessment focuses on what is learned, how good is the students' time management in part of the holistic craft process and what could be done differently. *Pragmatic* self-assessment is clearly the most formative assessment and it includes many of the students' choices for example choosing a work technique or finishing the product. (Shaw 1999; Kivipelto 2008; FNAE 2014.)

The purpose of this study was to clarify how students see self-assessment as a part of a holistic craft process. In this article, we focus on to deepen the results of the open-ended questions.

Method

The study utilized as a mixed method approach. It was important to use both qualitative and quantitative methods to answer the research questions profoundly. Mixed method can provide an overall picture of the issue at hand. (Johnson & Onwuegbuzie 2004; Johnson & Onwuegbuzie 2007.) In this article, we seek an answer to the research question: How do students consider self-assessment as part of their holistic craft process? Students' conceptions, attitudes and experience of self-assessment were studied. The result was examined also by gender.

An online inquiry was organized in May 2017 in a city of 54 000 inhabitants. Students (N=508) from sixth and ninth grade of comprehensive schools answered the survey anonymously. The inquiry was carried out during the school day in an electric learning environment. The teachers of each class gave the students instructions based on the researcher's forewords. Of the possible population of sixth and ninth grade students, 47,5 % took part to the inquiry. In the questionnaire, there were 35 Likert-scale questions, which were divided as follows: background variables, 4 variables that describe evidence based self-assessments, 4 variables for reinforcing self-assessments, 5 for reflective self-assessments and 5 for pragmatic self-assessments as well as open-ended questions. The questionnaire was based on the questionnaires of, Bland (2005) and Finnish National Agency of Education (Laitinen, Hilmola & Juntunen 2011; Hilmola 2011). In the preliminary testing of the questionnaire, problems were not perceived.

Sum variables, which were in accordance with the normal distribution, were formed in the analysis. The reliability coefficient of sum variables, the Cronbach's alpha was adequate in all the categories of self-assessment. The values were between 0,62 −0,90. A content analysis was used to inductively analyse the open-ended question data.

Results

For a statistical analysis, the sum variables were formed from different self-assessment categories (Table 1). The means of sum variables were between 2,92 –3,33 and standard deviations were 0,83 –0,88. Sum variables were normally distributed. According to the data the students had most experience in evidence based self-assessment and least in reflective self-assessment. Reinforcing and pragmatic self-assessment were in between these extremities. The results showed that the students from both sixth and ninth grade who were used to self-assessment in CDT were more open to the idea of self-assessment being a way to improve their learning, which was not the case with the ninth graders who did not study CDT as optional subject (Saarnilahti et al 2019).

Table 1: Sum variables mean and standard deviation in different categories of self-assessment (N=508). Likert scale 1= totally disagree – 5= totally agree.

Sum variables of different self-assessment categories	*Evidence based*	*Reinforcing*	*Reflective*	*Pragmatic*
M	3,33	3,19	2,92	3,14
SD	0,88	0,84	0,83	0,83

There were statistically significant differences between the girls and the boys only in two variables and the extremely significant difference in one variable. On these variables the averages were between 2,67 –3,47 and standard deviations were between 1,04 –1,28. Girl's attitude was more positive than boys' were. In the examination of all three variables the effect size however, remains small.

In the open-ended questions, students were asked what they think can be self-assessed in CDT, how often they self-assess their work and how and why the self-assessment is done. The students who understood the advantage and purpose of self-assessment better were more versatile in their answers than the students who react negatively to self-assessment. To some students (3%, n=15) the inquiry seemed insignificant and their answers were therefore scant. Majority of students (85,5 %, n=434) were able to identify the different parts of the holistic craft process when asked what can be self-assessed in the craft process. Designing, planning, manufacturing the product and final assessment were all mentioned in the answers. Only 14,5 % of the students (n =74) could not mention any self-assessment targets in CDT.

More than fourth of the students (27 %, n=138) thought that self-assessment was useful. It also reflects to their work by improving their learning. Students felt that self-assessing gives them an opportunity to communicate with the teacher about their successes and failures in the holistic craft process. Students felt that they could appreciate their finished products and their own work better when they had self-assessed themselves.
"It is made so that the student would learn to estimate himself honestly and realistically so that the student would learn to appreciate the quality of their own work and to appreciate its skills which he has learned during the work." (9th grade student)

To 53 % of the students (n=268) it seemed to be unclear for whom the self-assessment was done for. Some of the students thought, that self-assessment is made because of an external requirement, or that the self-assessment helps primarily the teacher to decide the grade for the student. Some of the students considered the self-assessment unnecessary and waste of time. Gladly self-assessment can also appear useful method of study one's own operations in learning.

"By doing self-assessment we learn to estimate our own learning. With self-assessment the student can see how he has succeeded and what there is still to learn." (9th grade student)

The majority of students (90 %, n=451) could describe what self-assessment is and could name at least one method of how to do it. The answers indicated that schools carry out self-assessment in CDT in different ways. However, answers were given anonymously so

comparing the schools was not possible in this study. Some of the answers indicated that self-assessment is usually done at the end of every craft process, others seemed to be using self-assessment only at the end of the semester. Self-assessment tools also varied. Some students used only digital tools to self-asses and some used paper forms. However, in most cases the tools used for self-assessment varied.

> *"In the self-assessment, the student himself estimates his own working. The self-assessment can be made verbally, in writing, with the teacher's management, independently, and such like."* (9th grade student)

Of the students who participated in the inquiry, 15 % (n=76) indicated that they do self-assessment in CDT often. The one worrying fact is that 20 % (n=101) of the participants said they never did any self-assessment whatsoever.

Conclusion

According to the results self-assessment is mostly well received and practiced among students when they have had enough time and guidance to get used to it. Self-assessment helps students to understand the causal connection of the holistic craft process, the technological solutions and one's own operation as a learner. Students' accuracy of assessing themselves improves by practice (Guest & Riegler 2017). That is why teaching self-assessment to students must be considered carefully in planning a holistic craft processes and in teaching in general. Self-assessment must occur often and in many forms since the beginning of the school path. However, establishing the self-assessment practices is challenging, and attention should be paid to different ways to use self-assessment as an advantage. Self-assessment can be divided to smaller categories as we did in questionnaire to help students to understand the various phases of a holistic craft process.

The central result of the study is that the ninth grade students' conception of self-assessment was negative when they had not studied CDT as an optional subject in 8th or 9th grade. One could argue that CDT is one important context to teach self-assessment to all students in comprehensive education. Students who indicated that they have never done self-assessment are a worrying group for these skills are required in further education. The advantages of the self-assessment in learning are clear in higher education (Bland 2005; Brown et al 2015; Guest & Riegler 2017). Considering these students, one may ask whether all teachers teach and counsel students to use self-assessment by themselves. However, the significance of self-assessment emerges with the student's increasing ability to self-assess. The skill of self-assessment promotes learning and strengthens students' commitment to one's studies. (Hanrahan & Isaacs 2001; Keto 2015; Uusikylä & Mäkinen 2015; Lepistö 2004; Pöllänen & Kröger 2005; Ross 2006; Nicola & Macfarlane-Dick 2006.) In a practical teaching situation, a teacher has to present students with the different phases of a holistic craft process. It is easier for a student to estimate one's own learning and operation if he/she understands the method and purpose of self-assessment. The significance of self-assessment for the student will become clear when the self-assessment methods are easy enough. With the careful design and planning of the product at the first phase of the process, it is simple to concentrate on thinking if the finished product meets the plan. When the principles of self-assessment are clear to students, they will understand the significance of it in supporting their own learning.

Despite that, the study was geographically carried out with a small sampling the results point out the fact that students' who are used to self-assessment will understand how self-assessment supports learning. Nearly half of the whole population in question answered to the inquiry. On this basis the results of the study can be considered quite representative in terms of the questionnaire survey. The results can therefore be generalized to a wider group and to other subjects. The next phase is to study how students' self-assessment shows in CDT from the teachers' point of view. Combining the findings of both studies, we can begin to build new self-assessment tools.

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