

Introducing ePortfolios to IT students: The support process

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Abstract

Implementing ePortfolio takes time and increases teachers' workload due to the support the students will need. In a preliminary study, support material was developed and tried out among four student assistants from the second year of a three-year bachelor's degree program in information technology. The objective was to identify types of support and how to design the support to make students as independent as possible when developing ePortfolio for the first time. Based on the preliminary study findings, we customized the support before introducing ePortfolio to an entire class in the study described in this paper. This research aims to gain insight into students' perception of the support they received and how a support process should be carried out to succeed with ePortfolio implementation. Empirical data was collected among students attending the second year of an IT education emphasizing organization and business. The findings demonstrate the importance of providing students with sufficient support, and that the support process should take place with an instructional scaffolding approach.

1. Introduction

The electronic portfolio, or ePortfolio, originates from the traditional paper-based portfolio. While the traditional paper-based portfolio lists academic work and achievements, the ePortfolio shows examples and provides students with a place to collect examples of work experiences and reflecting on those examples and what they represent. The content in ePortfolios may include text, images, video, and sound as evidence for individuals' lifelong learning and skills in an academic and professional context [1]. The ePortfolio is also a tool that demonstrates the connections between the documents offered as evidence of learning so that target audiences can assess the student's capacity for graduate study or employment. The artifacts and the associated reflections are evidence of achievement and demonstrate skills, competencies, or learning acquired from education, training, or work experience [2].

When Dysthe and Engelsen [3] investigated the complexity of factors that influence ePortfolio conceptualization and development, they found it useful to distinguish between three levels. The first one is the macro-level, where the political policy level gives top-down signals and directions. The second one is the meso-level, which relates to a department or institute where ePortfolio decisions are made related to study programs, course designs, and assessment, and where top-down influences may be strong. The last one, the micro-level, is when individual teachers have decided to use ePortfolio in their courses [3]. In this study, we are on a micro-level, where the students were introduced to ePortfolio in a course.

ePortfolio implementation challenges need to be explored and addressed before effective integration can occur [4]. In this study, students in an entire class are introduced to ePortfolio using a support process designed in a preliminary study. The support addresses challenges students may face and is designed to making students as independent as possible when developing ePortfolios for the first time. ePortfolio implementation often increases teachers' workload due to the support students need, and most teachers do not have time to put in the necessary effort.

The following research questions have been leading the way for this research: RQ 1 What was the students' perception of the support they received? RQ 2 How should a support process be carried out to succeed with ePortfolio implementation?

This study provides insight into students' development of ePortfolios and identifies barriers from the students' perspective. It is important to understand the students' perceptions when new technology is introduced to the teaching and learning environment [5]. The study described in this paper might be a valuable contribution for teachers and universities planning to implement ePortfolio as a tool in higher education. The first section of the paper explains the research background by looking at the need for ePortfolio in Information technology (IT) education, theories, and relevant studies. The next section describes the preliminary study, which is essential to understand the study described in this paper. The fourth section describes the support process in the present study and the research method. Next, the students' development of ePortfolios is described, followed by a section on discussion and implications before a conclusion.

2. Background

Most ePortfolios are developed with a focus on learning outcomes and are described as developmental portfolios. Higher education institutions in Europe, develop lists with statements of intended learning outcomes for each course and program. The learning outcomes are based on a quality agreement of higher education in Europe called the Bologna Process [6]. To address the intended learning outcomes, teaching and learning activities, assessment tasks, and criteria should be aligned to the learning outcomes [6].

Learning outcomes are statements of knowledge, skills, and competence students are expected to have when they graduate [7]. The learning outcomes for courses and programs consist of a set with knowledge elements and skills elements. When the students, through learning activities and assessment tasks, show that they can turn learning into action, they have obtained specific competencies [8, 6].

The concept of competence is used in the debate on employability skills as it encompasses some characteristics that help address the demand-side and job requirements and in higher education reforms because it connects education and job requirements [9]. Accordingly, employability is underpinned by the concept of competence, which involves a set of assumptions about graduates' attributes and job requirements. The concept of employability has significantly gained importance since the 1990s. By now, it is considered as a central objective of education policy not only by the EU but also by UNO and OECD [10]. The focus of higher education is to build students' competence and self-awareness for future employment [7]. As such, most universities use promotional lists of 'attributes, capabilities, or competencies' that graduates should acquire during their studies. In this paper, we adopt the term competence, drawing on the work of Frezza et al. [8]. The definition is established for an educational setting and asserts that competence is an integrative function consisting of knowledge elements, a set of skill elements, and disposition elements. Disposition is described as the ability to turn learning into action [8]. The definition by Frezza et al. [8] is very similar to the common understanding of the learning outcomes described by Kennedy et al. [11], what students are expected to know (knowledge), understand (skills), and demonstrate at the end of a course or program (competence) [11].

Students are however not always aware of achieved competencies when graduating from higher education, which makes it challenging for them to recognize, develop, and evidence their employability [12]. For IT students, it can be even more challenging because, unlike, e.g., police- and law education, that mostly holds the same content in the education and at work, IT educations are quite different. IT educations have very

varied content, from the emphasis on the technical and the basis of science (e.g., computer engineer), through studies emphasizing programming to studies linked to organization and business. The job market is also broad, and job content changes continuously. Themes such as cloud services, big data, and social media are examples of subjects that have changed the IT industry in recent years [13]. Alexiou & Paraskeva [1] describe the process of reflection on artifacts involved in the development of ePortfolio as one that makes invisible learning visible. Thus, ePortfolios can be a suitable tool for IT students. Two of the biggest challenges for students when developing ePortfolios is selecting artifacts and reflect on them [14]. Researchers and others interested in ePortfolios hold several instructional sessions with training and support to address these challenges [2, 12, 15, 16]. The sessions increase teachers' workload due to the support students need and it has been recommended that further empirical research incorporates approaches that do not require as much time and effort from the teachers [16].

3. The preliminary study

The preliminary study [17] preceding the study presented in this paper represents an initial exploration of ePortfolio support, the design of which was based on the research literature. In spring 2019, four student assistants from the second year of an IT education at the Norwegian University of Science and Technology (NTNU) participated in a study where they developed ePortfolios for the first time. They were introduced to Google Sites ePortfolio, which was selected based on usability [2, 18]. This solution was evaluated and compared with other solutions based on the students' ability to have control, the opportunity to decide the degree of access and permission, and the tool features [19]. The solution supports lifelong learning as it allows the student to use their ePortfolio after graduation, as long as they want to continue working on it. The learning management system in use at NTNU, Blackboard, also has an integrated ePortfolio. However, when students graduate, they lose access to Blackboard. Thus, Blackboard's ePortfolio is neither suitable as a tool for lifelong learning or further development and use after education.

The preliminary study's objectives were to identify types of support and design a support process that made students become as independent as possible when developing ePortfolio for the first time. The student assistants were provided with support designed based on findings in relevant literature focusing on ePortfolio implementation. Data was collected by observation in a session where the students were introduced to ePortfolios and by reading the reflection notes written by the students after they had worked on their ePortfolios for three weeks. The methodology used in the preliminary study was a case study approach and was the first cycle in a broader action research study [17]. The principle in action research involves steps in an iterative, cyclical process of reflecting on practice, taking action, reflecting, and taking further action [20].

3.1. The support in the preliminary study

The support in the preliminary study, described in this chapter, was designed as a process, where the introduction consisted of promoting the ePortfolio to motivate the students to develop their own ePortfolio [17]. A set of support material was reviewed by the students under guidance from the researcher before the students started with the ePortfolio development. This approach was based on the fact that it is through the promotion in the introduction that students' basic understanding of own value can be created, and thus motivate students to develop ePortfolios [15, 18].

The introduction session started with a presentation of the concept of ePortfolio focusing on promoting ePortfolios and motivating the students [19]. The students were informed what an ePortfolio is and why it could be of value for them [1, 19, 21, 22]. After

the introduction, carried out by the researcher, the students were given a combination of three different types of support material: a tutorial video, ePortfolio examples, and a descriptive document named *Selection of artifacts*.

The tutorial video explains step-by-step how to set up an ePortfolio with Google Sites, a method adopted from a study described by Belvin and Brill [23]. Next, the students were given links to ePortfolio examples, which included one made for this purpose. The latter contained artifacts and content relevant to IT education. Finally, the students were given a document named *Selection of artifacts*, which described how to select appropriate artifacts and write reflections for each artifact.

To guide the students through the writing of reflection, we adopted a method by Ring et al. referred to as the What, So what, Now what model (see Table 1). The model consists of guiding questions to help the students connect past experiences with present understanding and future use or action [8]. The model is designed based on Kolb's [24] experiential learning theory.

Table 1 What, So what, Now what with Guiding Questions [16]

Reflective category	Guiding questions
What?	What did I do? What was the assigned task?
So What?	What did I learn from this experience? What was the importance and/or significance of my discovered learning?
Now What?	How can I use the learning in the future? What am I prepared and equipped to do as a result of this learning experience?

For the selection of artifacts, the document explained that competencies are listed in the learning outcomes associated with the courses and how they could connect the work they have done to competencies. This part of the document included three examples with different competencies from the learning outcomes in a course.

The students could design the ePortfolio the way they wanted. However, a minimum requirement was that it should contain two pages. The first one should consist of a presentation of themselves with names and a description of their educations. The second page should consist of artifacts and associated reflections. The students always had access to the support material so that it was available when needed. Thus, this study gave the student assistants four key components they had to complete; setting up the ePortfolio, present themselves, select artifacts, and write reflections.

The preliminary study unveiled three main challenges, which needs to be addressed in the support. First, understand the value of developing an ePortfolio. One of the students did not understand the value and decided not to continue developing the ePortfolio. Second, the students did not fully understand what was meant by competence, making it challenging for them to select appropriate artifacts among their previous work. Third and last, it was challenging for the students to figure out how to make the artifacts visible in the specific tool.

4. The present study

4.1. The customized support

Based on the preliminary study findings, the support process was customized before ePortfolio was introduced to an entire class. A clear distinction was made in the

introduction between using the ePortfolio as a tool to show-case and as a tool to create self-awareness. A new document named *Visible artifacts* was developed, which described how to make artifacts visible in the ePortfolio. The document *Selection of artifacts* is more of a pedagogical nature. Providing students with two documents, one with pedagogical support and the other addressing technological support may create a clear and positive distance between those two. As in the preliminary study, students could design the ePortfolio as they wished, but the ePortfolio had to contain at least two pages, one with a presentation of themselves and the artifacts with reflections on the second page. On the first page, the presentation, they were told to introduce themselves with names and relevant information about their education.

In contrast to the preliminary study, the class's students were told what course work they could add as artifacts in the ePortfolio. Each assessment task in the course contains 4 to 6 sub-assignment. In each assessment task, the students were recommended a specific sub-assignment that fit as an artifact in the ePortfolio. The recommendation was made to avoid the students spending too much time on the process and perhaps losing motivation. The students also received feedback on the submitted assessment task and the assignments related to the ePortfolio. Although the students were told what should be added as artifacts in the ePortfolio, in contrast to the procedure in the preliminary study, the document *Selection of artifacts* described what is meant by competence. The definition of competence was linked to the learning outcome by describing the link between the three aspects knowledge, skills, and competence in the learning outcome. The support material was made available to the students and reviewed in the introduction before the students in groups began to set up their ePortfolio.

4.2. Research method

The methodology chosen for this research is a case study approach and the second cycle in the broader action research study. Based on findings in the first cycle, the preliminary study, the support was customized and lanced in an entire class. At the beginning of the semester, in the autumn of 2019, 43 students were introduced to ePortfolio for the first time in a single course. The students attended the second year of an IT education, emphasizing organization and business.

Data were collected by interviews, observation and by analysing the students ePortfolios. At the end of the second semester, 17 students participated in semi-structured interviews. Semi-structured interviews are particularly suitable when more than a few of the open-ended questions require follow-up queries. Open-ended questions give the interviewee the possibility of expressing his or her opinion and thoughts [25]. The interviews were conducted by the researcher using an interview guide. The questions were targeted to get insight into the students' views of the support they received, to help us understand how a support process should be carried out to succeed with ePortfolio implementation. Because the observations revealed that not all students were equally motivated to develop an ePortfolio, a targeted quota was set when the students were invited to participate in the interviews. In this way, the interviews cover all types of students in this class, from the most motivated to those who were less motivated. These students were asked in an email if they would participate in the interviews.

The observations were conducted in the first session of the course, where the students were introduced to ePortfolio. The students were given 20 minutes of the course session to set up their ePortfolio. For this, the student was divided into groups so that they could support each other. In addition, an analysis was made of the students' ePortfolios. The researcher had access to all the students' ePortfolio through a link to each student's ePortfolio. At the end of the last semester, in spring 2020, the ePortfolios were evaluated

for research purpose based on their first page of the ePortfolio, the presentation, and whether they had managed to add artifacts and write reflections using the guiding questions in the What, So what, No what model (see table 1). The control factors, presentation, artifacts, and reflections were evaluated as high, medium, or low levels. If the student had done less than expected and described in the introduction, the control factor was evaluated to be on a low level. If they had done what was described in the introductory session, they were evaluated to a medium level and a high level if they had done more than what was described. This categorization helped us create an overview of the quality of the ePortfolios. Although qualitative and quantitative research methods individually can generate sufficient information, using a combination of two or more methods will increase the quality of the research as they together provide a better understanding of the problem [26].

The interview was imported into NVivo for coding and thematic analysis together with the observation notes. The observation notes and the interviews were compared before clarifying the meaning of what worked when it comes to the given support and what was challenging for the students. Furthermore, sub-challenges were identified, and potential links between them.

5. Results

All the students managed to set up the ePortfolio using the tutorial video and the ePortfolio examples. The observation in the session revealed that the students frequently watched the tutorial video and the ePortfolio examples. The students actively participated in their group, discussed opportunities, showed each other their choice of template, and supported each other. The observation of the students ePortfolios revealed that all the students had produced a minimum of two pages: one page where they presented themselves and one for artifacts and the associated reflections. Figure 1 shows the overall result of the quality of the students ePortfolios. The high, medium, and low levels are based on the control factors, presentation, artifacts, and reflection, as described in chapter 4.2. Research method.

On the first page were the students presented themselves, 19 % of the students wrote only their own names and the study program's name, 54 % of the students, in addition, wrote what they would be able to do when graduating. Several students did more than expected, where 27 % of the students also described what visitors would find in the ePortfolio and contact information.

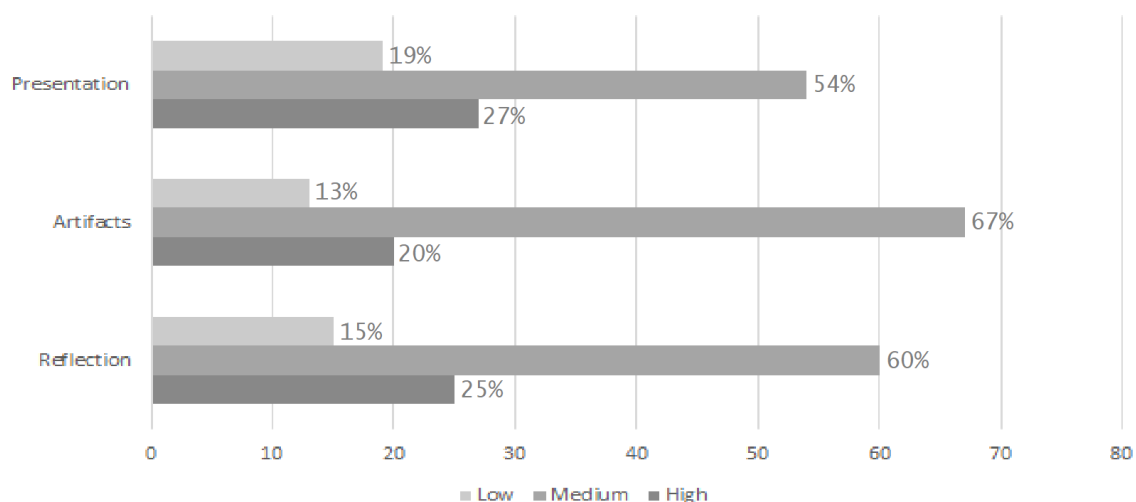


Figure 1 Levels of the students ePortfolio content

When it comes to the artifacts, 13 % of the students did not make the artifacts visible, and 67 % of the students did what was described in the ePortfolio introduction and through the course's assessment task. In addition, 20 % of the students submitted more artifacts than they were told to add. These students added artifacts from all the courses they had in the two semesters with accompanying reflections. Student with medium and high quality found the document *Visible artifacts* that described how to make artifacts visible, useful. However, one student said in the interview that not everyone used the support material: *"When we worked together to set up the ePortfolio, I noticed that some in my group chose not to read the documents that described the procedures. They did not seem very motivated to work with their ePortfolio."*

In the interviews with some of the students who had not managed to make the artifacts visible, the students confirmed that they did not look at the support material. The interview also revealed that they did not listen to the ePortfolio introduction because, at the start of the ePortfolio introduction, they understood it as if the ePortfolio was just a new submission tool in addition to Blackboard. One student adds: *"I feel that the ePortfolio leads to extra work because we have to submit the assessment task twice one in Blackboard and one in the ePortfolio"* Another student described it this way in the interview: *"To me, the ePortfolio seemed like another place to submit an assessment task. A bit like Blackboard. I see no point in investing much energy in learning another tool for delivering assessment tasks."*

The quality of the students' reflections varied. Fifteen percent (15 %) of the students described only which assigned task the artifact was a result of, and 60 % of the students answered the questions directly, where there was no flow between the answers, i.e. a logical structure between the answers to the questions. Twenty-five percent (25 %) of the students wrote reflections with fluency, and it was clear that they had put much effort into the reflections. The same students added more artifacts than they were told to add to the ePortfolio in the assessment tasks.

Some students found it challenging to write reflections. In particular, they found the questions related to "Now what" challenging to answer. They found it easier as they gained more practice. One student believes the challenge is a result of them not being used to writing this kind of reflections: *"Putting what I have learned in perspective with what I can use it for is new to me. This was the most challenging part when writing the reflections. Especially in the beginning, but I found it easier as I wrote more and more reflections."* Another student confirms this; *"This is a completely new way for us to absorb what we have learned. I probably need more training to write good reflections, but I notice that it gets easier and easier."* Some of the students that had low level reflections did not read the document *Selection of artifacts*, which described how to write reflections. This applied to the same students (13%) who had low level artifacts and did not managed to make the artifacts visible. In the feedback on the assessment task, these students were reminded of the document and how to write reflections. However, the observation of the students ePortfolio revealed that the feedback did not lead to any improvements.

In the second semester, 20 % of the students started adding artifacts from other courses. These students found the definition of competence useful and especially related to the learning outcome. One of the students described it like this in the interview: *"Now I know the relation between knowledge, skills, and competence in the learning outcomes, and I don't think I would have managed to select appropriate artifacts without this knowledge."* Another student also described it as useful to see the definition of competence in relation to the learning outcomes: *"Understanding the learning outcome through the definition of competence was very useful for me and simplified the process of selecting artifacts."* A third student adds that competence is a term often used, but the

student has never considered the meaning of the term: *“I have assumed that competence is about experiences, but I now see how the concept is related to what we learn and that it is not only about experiences but also how I use what I have learned. I think my ePortfolio will highlight the competencies I have gained through education, especially for me, as I have no work experience”*.

The interviews revealed that several of the students found it useful to develop an ePortfolio. One of these students said in the interview: *“ We are often given assessment tasks where we are asked to reflect on what we have done, but it is forgotten shortly after submission. After putting together artifacts and reflections in the ePortfolio, I notice that I not only remember what I have learned, but I understand what competencies I have gained.”* Another student described how the ePortfolio with the reflection made the student think about what had been learned: *“I notice that the process of selection and reflection and putting it together in an ePortfolio made me more aware of what I had learned.”* A third student adds that: *“I now see that I have acquired competencies that will be relevant when I apply for work. The ePortfolio also made me more aware of how I can present my competencies to a potential employer”*

6. Discussion and implications

This research aimed to gain insight into students' perceptions of the support they received and how a support process should be carried out to succeed with ePortfolio implementation. Findings indicate that the support material itself was sufficient, but if students lose the ePortfolio introduction, they may not be motivated to develop ePortfolios. This chapter discusses students' experiences of developing ePortfolios using the support material developed in the preliminary study and customized before the study described in this paper.

6.1. The support process

All the students managed to set up their ePortfolio by looking at the tutorial video and the ePortfolio examples. However, in the session where the student spent 20 minutes of the course session setting up their ePortfolios, it was observed that the students supported each other. Although the support was designed to address challenges students may face, it is sometimes the case that some students often understand what other students misunderstand. Working in groups creates a space where students can support each other. It requires less effort from teachers than if each student is to receive help. Furthermore, discussions in such groups can lead to students becoming more confident when it comes to their ePortfolios because they have received support from fellow students.

In further work with the ePortfolios, the students worked individually to enter artifacts and write reflections. A few students wrote incomplete reflections and failed to make the artifacts visible. This was not due to shortcomings in the support, but lack of motivation. They were not motivated to develop ePortfolios and had the fixed attitude that this was not something they would spend time working with. We believe that their lack of motivation is not a sign that the support provided in itself was inadequate. The tutorial video and the ePortfolio examples helped the students set up the ePortfolio, and the document *Visible artifacts* which addressed a technological challenge helped the students make the artifacts visible. The document *Selection of artifacts*, which addressed pedagogical challenges, helped the student in several ways. The document created awareness about the course learning outcomes, and it led to the students seeing the usefulness of the learning outcomes. Furthermore, the students experienced the description of how to write reflections as useful but challenging. The students who wrote reflections where they answered the questionnaires directly directly, with no logical

structure between the answers to the questions, thought that they would become better with more training in writing reflections. The students who had high-level reflections were the same ones who added artifacts with accompanying reflections from other courses. This may indicate that as they write more reflections, it becomes easier for them to write reflections because the training enabled them to better understand what is learned, and what they are capable of in the future as a result of the learning. Helping the students get such insights is the reason for using the What, So what, Now what model developed by Ring et al. [16].

It can be argued that the students' presentation on the first site in the ePortfolio is important and should also be evaluated. In this study, we found it essential as one of the first tasks the students were given was to write a presentation of themselves. After some weeks where the students worked on their ePortfolio, it became clear that those who had incomplete presentation also failed to write good reflections and make the artifacts visible. In turn, these were the same students who did not listen to the ePortfolio introduction. The result indicates that those who did not follow the introduction were not motivated to invest time developing ePortfolios. These students referred to the ePortfolio as another place to deliver assessment tasks in addition to Blackboard. Thus, they have not understood the value of developing an ePortfolio and were therefore not motivated to work on them. As Shroff et al. [18] and Roberts and Maor [15] point out, through the promotion in the introduction, students understand the value of developing ePortfolios. It is the understanding of the value that creates motivation, which became very clear in this study. However, most of the students paid close attention to the introduction. These students applied the support material as intended and were motivated through the introduction to start working on their ePortfolios. They perceived the support as useful and could not point out anything that was missing. Such a response may indicate that the support material itself was sufficient. Our findings also seem to support the assumption that the possibility of success with implementing an ePortfolio solution on a larger scale increases if the challenges are identified through a smaller group of students and addressed before introducing ePortfolio for a larger group of students.

The students were introduced to ePortfolio in one specific course, and there was no requirement that they had to add artifacts from other courses. After the first semester, where the students were told what to include as artifacts in the ePortfolio through the assessment task, some students began to add artifacts from other courses. The students who added artifacts from other courses referred to the combination of the definition of competence and the learning outcome as useful. When they understood the connection between the component in the learning outcomes through competence, it became easier for them to select artifacts from other courses. A scaffolding approach on a micro-level may be appropriate when implementing ePortfolios, as this study indicates that when the students are introduced to ePortfolios in a course they gain transferable learning skills which enable them to use the ePortfolio across all the courses in the study program.

Furthermore, results in this study show that some students after a while are able to select appropriate artifacts for the ePortfolio from other courses. This indicates that a scaffolding approach may make all the students become capable of independently selecting artifacts. If students in a study program are to be introduced to ePortfolio, it can thus be an advantage that the ePortfolio introduction takes place in a course already in the first semester, also pointed out by some of the students in the interview. Instructional scaffolding in the first semester where teachers recommend what fits as artifacts in assessment tasks may enhance students' mastery of selecting artifacts for the rest of the semesters in other courses.

Through the courses in the study program the students acquire several types of competencies. Several of the students interviewed in this study, agreed that developing ePortfolios was useful and that the ePortfolio process was a component that created self-awareness of what they have learned i.e. gained competencies. If the student does not know which competencies they have acquired, it can be challenging for them to recognize, develop, and prove their employability according to St Jorre and Oliver [12]. As such the ePortfolio may create self-awareness i.e., strengthen one of the focus areas of higher education [7]. For IT students, ePortfolios can be an essential component in creating awareness in the face of the changes that are constantly occurring in the field [13] and make them able to connect their education and job requirements [9].

6.2. Limitations

A limitation of questions in this study is the selected ePortfolio tool. The creation and hosting of ePortfolios is a complex technical issue with wide-ranging policy and practical implications. It is assumed that using a solution that are integrated in the environment the students already know, like Blackboard, will probably be an advantage especially when it comes to security and privacy. Because this is not an option today, other solutions were considered, but if the ePortfolio is to become a standard at a university, it must be a tool that allow students to continue using the ePortfolio after graduating.

An additional limitation is the questions of generalizing. The students in this research have high experience in using different kind of digital technology. Other results may result from a study with a different sample from another field. However, a preliminary study can be important regardless of the field. At the same time, motivating students does not depend on field types but will apply to everyone regardless of the field. Thus, the support process, as described can be used in other fields, but with different content in the support material. What support is needed can vary regardless of field. The type of support material needs to be identified before introducing ePortfolio in a broader context, as described in this study.

7. Conclusion

The aim of the research presented in this paper was to gain insight into students' perception of the support they received and how a support process should be carried out to succeed with ePortfolio implementation. The promotion of the ePortfolio in the introductory session motivated the students to develop ePortfolios, and most of the students in this study perceived the support they received as useful and instructive. Some students did not manage to make the artifacts visible or write appropriate reflections, but this seemed to be because of lack of motivation and not the support. The support was designed as a process with the aim of motivating the students to develop ePortfolios. Those who for some reason lost all or part of the ePortfolio introduction misunderstood the purpose of the ePortfolio and thus were not motivated to develop ePortfolios.

An important finding in this study is how some students, after a while, became able to select artifacts themselves, and further that they believe they need training to write good reflections.. This finding indicates that the support process should take place with an instructional scaffolding approach. A scaffolding approach on a micro-level may be appropriate when implementing ePortfolios, as this study indicates that when the students are introduced to ePortfolios in a course they might gain transferable learning skills enabling them to use the ePortfolio across all the courses in the study program.

Further research should look at the effect of developing ePortfolios and especially the effect on self-awareness when it comes to competencies. Another area for future research relates to the use of the technology to scaffold students in the ePortfolio development by

adding prompts into an ePortfolio system that help students think through and answer the “what?”, “so what?”, and “now what?” questions.

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