Perspectives on personal learning environments held by vocational students

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ABSTRACT

This article focuses on personal learning environments (PLEs). The idea with PLEs is to put students in a more central position in the learning process by allowing them to design their own learning environments and by emphasising the self-regulated nature of the learning. This study describes the structure, functions and challenges of PLEs made by 33 students from vocational and polytechnic level schools in Eastern Finland after the first year of using them. Document and artefact analysis revealed that students built their PLEs for: mirroring the conventional learning environment; as an environment for reflection; as an environment to showcase skills; and as an environment for collaboration and networking. Student reflections indicate that building and using a PLE is a challenging task which requires specific teacher and pedagogical support. Designing a PLE demands both ICT skills and an awareness of one's own learning methods.

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1. Introduction

Today's world, described as a knowledge society (Hargreaves, 2003; Sahlberg, 2010) and an information age (Scardamalia, 2001), poses challenges for educational institutions and their teachers. Hargreaves (2003) argues that today's students must learn deep cognitive skills to foster problem solving and collaboration, i.e. the skills needed to cope with changing and new situations. Scardamalia (2001) emphasises developing skills for lifelong learning. These skills are associated with teaching methods which encourage students to take more active roles in learning, less so with methods based on knowledge transmission. The so called 'net generation' poses further challenges. Net generation refers to students born in the 1980's and the beginning of the 1990's. These students' are assumed to have skills for using information and communication technology (ICT) and also expect collaborative and student-centred learning activities with ICT (Barnes, Marateo, & Ferris, 2007; Oblinger, 2003).

A newcomer in the field of ICT and education is personal learning environments (PLEs). PLEs have been suggested as one solution to the challenges described above. There are several definitions of PLE, the common factor being their potential of offering new ways of using ICT for student-centred learning. Students are placed in a central role as designers of their own learning environments, emphasising the self-regulated nature of the learning process (Laakkonen & Juntunen, 2009; Schaffert & Hilzensauer, 2008). PLEs are typically described as a collection of different ICT tools and software, usually social software, to foster self-regulated and collaborative learning. The strongest visionaries of PLEs suggest that they are the next step in the development of educational technology, a replacement for learning management systems (LMS), providing tools and learning practices to meet the needs of the knowledge society (Mott, 2010).

The research reported here is a qualitative case study. As a research topic, PLEs are challenging environments due to their uniqueness, reflecting individual student's learning needs and ways of learning. The principal aim was to make visible the outcomes of students' free planning and building of PLEs. The research question was: what kind of personal learning environments would students produce, for what purposes and functions? The analysis also brought up challenges related to use of PLEs. Results gained were also compared to the assumptions relating to the use of PLEs described in the theory background.

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2. Theory background

This section reviews the theoretical groundings for PLEs that have been used to justify their use and development in teaching and learning. It also presents critical observations on recent publications and assumptions about PLE.

According to Dillon and Loi (2008), a learning environment can be seen as an entirety with people and physical, technological, psychological, social and cultural resources. From the narrower point of view, learning environments can be defined simply as online environments such as *Moodle* or *Blackboard*, i.e., learning management systems. Environments have evolved in conjunction with theories of learning and developments in ICT (Koschmann, 1996; Lai, 2008). Theories of learning that stress students' self-regulating roles demand more flexibility so that the students can engage with learning in line with their own aims and through their own methods (Boekaerts, 1999). PLEs can be seen as a continuation of developments enabling students to build their own learning environments to meet their personal aims and goals of learning (Attwell, 2007; Hietanen & Valtonen, 2010).

2.1. Features of PLE

PLEs have been proclaimed as the next step from learning management systems. According to Downes (2005), LMSs are mainly tools to deliver and organise teacher-made course content, setting students in a rather passive role as followers of course modules at a pre-determined pace. The idea of PLEs is to set students in more central roles in two ways: first, students are allowed and encouraged to build and administer their own learning environments in ways that best suit their learning needs and purposes; second, the aim is to provide students with a more active role in the learning process, as self-directed agents taking more responsibility for their learning (Attwell, 2007; Schaffert & Hilzensauer, 2008). Attwell (2007) describes the use of PLEs as a new way to use ICT to support both formal and informal learning and especially to recognise and access informal learning outside educational institutions, suggesting that PLEs are tools for lifelong learning.

Most descriptions of PLEs concentrate mainly on their technological properties. Downes (2010) describes the essential elements of a PLE: it should contain tools for managing a personal profile, tools for editing and publishing materials, and tools for retrieving external resources and materials from different websites. In addition, a PLE should contain mechanisms for supporting learning, i.e. means for scaffolding learning activities and possibilities for connecting the PLE to external services, especially tools for communication. Downes also suggests that a PLE should contain 'intelligence' that would direct students towards appropriate resources and activities i.e. a PLE should 'learn' from the habits of the students who use it. Attwell's (2007) detailed description of a PLE consisting of common everyday office and social software includes many of the features suggested by Downes: tools for producing and publishing content in different formats, tools for communication and collaboration, tools for time management, and tools for searching and aggregating materials and resources.

Sclater (2008) offers three different visions for PLEs. First, PLEs can be based on client software that students choose and download to their computers. The idea here is that the software can be used offline and when a student accesses the Internet the software interacts with the institutional system to upload and download necessary content. Second, PLEs can be seen as made up of several types of externally hosted software, typically social software that students can freely choose. The idea here is that students can make use of the best elements of different software for specific learning purposes. The third vision proclaims that PLEs are already here and in active use. In other words, students have their own laptop computers and different software and online resources that they use to support their learning. In this article, we are especially concerned with the second and third models of externally hosted software chosen by students, conforming to the descriptions of PLEs offered above by Attwell (2007) and Downes (2010).

2.2. Theoretical grounding for PLE

The concept of PLEs is relatively new and still developing. In this section we outline different theoretical aspects of PLEs in order to contribute to a grounding for the further development of their use. The idea of PLEs has strong similarities with the aims of personalised learning. PLEs aim to provide students with opportunities to build learning environments based on their own ideas and needs. Students' active and self-directing role in their learning is emphasised (Attwell, 2007; Schaffert & Hilzensauer, 2008). This closely aligns with the aims of personalised learning in taking advantage of students' diverse abilities, strengths and interests in order to foster engagement and realise potential (Green, Facer, Rudd, Dillon, & Humphreys, 2006). The aim of personalisation emphasises learning where students are encouraged to bring their unique ideas and backgrounds to the learning situation as resources that may be utilised by the whole class (Campbell, Robinson, Neelands, Hewston, & Mazzoli, 2007). Leadbeater (2003) sees personalisation at a more general level, describing a situation where different public services, for example schools, are environments where students take decisions about their learning in a certain self-managed way. Similar aims relate to the idea of PLEs.

In addition to personalisation, the use of PLEs has the potential to enhance so called 'ownership'. Attwell (2007) sees PLEs as learning spaces under the control of students. Mott (2010) also emphasises students' self-regulating role by defining PLEs as student-created matrices of resources that they themselves select and organise. These definitions stress the student's role as an administrator, controlling and modifying his or her learning spaces and ways of learning. The definitions also conform to Jonassen and Rohrer-Murphy's (1999) visions of ownership, of providing students with possibilities of defining and controlling their learning aims and methods. Ownership in these terms, it is argued, provides students with more meaningful learning experiences. Tolmie and Boyle (2000) refer to ownership as a factor affecting students' activeness in participating in learning situations. Similarly, Jones and Issroff (2005) and Pintrich, Marx, and Boyle (1993) argue that the belief of control is strongly motivating to students and has a positive effect on their academic performance. A student-administered PLE with self-created and self-regulated learning is assumed to increase feelings of ownership and control and to lead to more meaningful learning experiences.

According to Boekaerts (1999), self-regulated learning is a constructive and self-directed process emphasising students' metacognitive skills, i.e. skills for orienting, planning, executing, monitoring and evaluating the processes of learning. Hakkarainen, Bollström-Huttunen, Pyysalo, and Lonka (2004) suggest that cognitive processes can be divided into three levels: The first level involves processes of identifying and categorising phenomena and performing learning practices. The second level consists of processes of asking questions and providing explanations, etc. The third level is the metacognitive level emphasised in self-regulated learning. Hakkarainen et al. (2004) argue that

typically the students' role in learning remains at the lower level activities and the teacher's role involves the higher and meta-level processes. A specific aim with using PLEs is to promote metacognition in students' activities. Students are responsible for choosing appropriate tools and designing content for their environments in order to better support their learning.

The ideals and assumptions concerning PLEs align with the theory of collaborative learning. Collaborative learning refers to interactions between people that are expected to trigger mechanisms for learning (Dillenbourg, 1999). According to Mott (2010), the collaborative nature of PLEs shows in the networking of different PLEs. Integrated and overlapping PLEs provide possibilities for sharing and receiving material and providing feedback and communication. Attwell (2007) suggests especially peer group learning as one strong benefit of PLEs, as integrated and overlapping environments encourage students to engage in peer supported learning and to scaffold their learning. Collaboration also comes up in the 'indirect/semi-automatic/asynchronous' nature of automatic aggregation software such as *RSS* (*Really Simple Syndication*, a web feed format), shared bookmarks, tags and other tools of social software. Downes (2005) has described a model for using aggregation software, such as *RSS*, for collaborative learning. According to Downes (2005), learning materials and contents:

> "… *are aggregated by students, using their own personal* RSS *reader or some similar application. From there, it is remixed and repurposed with the student's own individual application in mind, the finished product being fed forward to become fodder for some other student's reading and use.*"

The indirect nature of collaboration is especially suited to social software, for example in the form of shared bookmarks, shared tags etc. One user's aims, opinions and interests are captured and shared as a resource for other users. The particular form of interaction described by Dillenbourg (1999) shows in taking advantage of the work and thinking that other users share through social software.

Altogether, PLEs can be seen as ways of concretising the above mentioned attributes of learning by allowing students to choose the methods and software for their learning. From this perspective, PLEs are seen as an ICT based pedagogical approach or model rather than a technological platform. As Attwell (2007) suggests, PLEs do not need specific, dedicated software, rather they can be based on everyday office software or social software.

2.3. Challenges in the use of PLEs

Although the visions of and assumptions about PLEs look promising, there are also challenges. PLEs are described as combinations of different software, usually social software (Attwell, 2007). Net generation students are assumed to be familiar with the Internet and different forms of social software (Hartman, Dziuban, & Brophy-Ellison, 2007). However, even though students may be familiar with the Internet and social software, it seems they do not necessarily know how to use these technologies for learning (Kvavik, 2005; Valtonen et al., 2011). A simple reason for this may be that students have never had the opportunity to do so in formal educational situations.

Another major challenge concerns the skills students possess for self- regulated learning. According to Hakkarainen et al. (2004), cognitive processes for planning, controlling and evaluating learning, i.e., metacognitive skills, typically have been mainly the teachers' responsibility. For students who are used to teacher-centred methods and external regulation by a teacher, self-regulated learning may be daunting (Boekaerts, 1999). Taylor and Burgess (1995) argue that students need orientation sessions where they can familiarise themselves with self-directed learning practices. Different communities and software have been suggested as means to meeting this need. For example, according to Schaffert and Hilzensauer (2008), an important element in learning is social involvement in different communities. The Internet provides an 'infinite bazaar' of learning content and opportunities. In addition to different communities, Downes (2010) suggest that PLEs should contain a tool that "learns about the user's reading habits, creative activities, and interactions" and directs students to the appropriate online resources and materials. Downes, however, does not define the tools that would do this. Nevertheless, these ideas align with the possibilities offered through Web 2.0, for shared tagging and indexing and suggestions based on user's earlier decisions as in, for example, *Amazon* recommendations and 'key word clouds' (O'Reily, 2005).

These ideas are challenging and pose questions concerning the roles and responsibilities of teachers and students. The issue of students as self-regulated learners using online resources has been raised earlier, especially at the end of the 1990's prior to Web 2.0. Lehtinen (1997) described as 'romantic constructivism' the assumption that students are skilled at using open learning environments and finding appropriate sources and information and the best methods for learning etc. Further, Lehtinen (1997, p 12–40), argued that this kind of approach typically leads to students impulsive wondering from one source to another, causing frustration. Is it possible that the new online environments of web 2.0 and different communities can provide some support for these challenges?

3. Research

3.1. Research question and context

The aim of this study was to gain an insight into students' perspectives of PLEs after they had been using them for one year. The research was conducted as part of a project called PeLE in one polytechnic and one vocational level school in Eastern Finland. The aim of this three year project is to embed PLEs into everyday practices in these educational institutions. The vocational level school was chosen as a site for the project and the research because of the alignment between expected needs concerning ICT skills developed and self-regulated learning that students will engage in through their working lives, and the characteristics of PLEs. The participating schools have several years of experience in using LMSs, mainly *Moodle*, in their teaching. The project sought not to replace *Moodle* but to introduce PLEs in addition. As with *Moodle*, PLEs are used as tools for supporting both contact and distance education. Most of the teaching arranged in these schools is face-to-face teaching. Online courses are typically optional.

The project provides a group of students with an opportunity to think about their own learning practices and how they could be supported by ICT. Students were also given the opportunity to 'think outside the box', i.e. they were allowed to stretch their imagination in regard of adding a personal touch to formal learning. The PLEs were intended for students as tools for their own working and learning, for processing content, for discussing about topics etc. With PLEs the aim is to move the responsibility of the learning process more to the students, to encourage students to take more active roles. The intention is to develop students' skills for learning, skills for working lives

when they cannot fall back on support from teachers. Learning materials are provided for students as before, for example as paper copies, web pages or via *Moodle*. The difference is that now students are encouraged to build a tool, a PLE, for processing, storing, editing and discussing the materials.

At the beginning of the project, there were meetings and seminars with teachers in order to discuss principles of PLEs and explore ideas prior to introducing them to students. The seminars touched on the ideas of Attwell, Downes and Mott discussed earlier in this paper stressing students' roles as designers of their own learning environments and their engagement with learning processes. Later, teachers arranged meetings where they introduced the idea of PLEs to their students. Students were provided with mini laptop computers and Internet connections to support their work. Teachers' and students' participation in the project was voluntary. During the first year, the students who participated in the project gained one credit for their work with PLEs. Students' ages varied from 20 to 46 indicating that the target group was not homogenously net generation. Most of the respondents, however, were under 30 years old ($N = 24$). Four of the respondents were in the age group 30–40 and three were over 40 years old. Two students did not give their age. Participating students were from six different fields of study: catering services ($N = 2$), international business ($N = 3$), health care ($N = 4$), computer science ($N = 5$), engineering ($N = 9$), and massage therapy ($N = 10$).

The idea of PLEs was new to the students. They were encouraged to build their PLEs using the software they found best for their own learning purposes but in preparation the challenges described in Section 2.3 were taken into considered. In order to help students who found it difficult to choose the tools and build their environment, *Ning* was suggested as a starting point. *Ning* is a platform for building online communities. Users can build their own environment choosing from several different applications and make links to other environments and pages. They can add applications such as blogs, discussions and videoconferencing and also store and publish material in different forms. *Ning* allows embedding of different external elements, for example videos from *YouTube*. The user can also define whether his or her environment is open or private. The idea of using *Ning* as a suggested tool came from the project staff and participating teachers and was based on its characteristics as an easily modifiable and free of charge environment. *Ning* was also chosen because it contains several tools that align with the characteristics of PLEs given in Section 2.1. Students were provided with basic training on how to use *Ning*. In this way all students had some initial brief for building their PLE. Beyond this initial training, students were given the choice of continuing with *Ning* and modifying it for their purposes, or using other tools or software.

For supporting students' 'first steps' with PLEs, they were given suggestions as to the design and purpose of their PLEs. For example, a suggestion for health care students was to build their PLEs taking into account learning during their practical training sessions. Computer science students were encouraged to take advantage of their PLEs in seeking a job. Engineering students were encouraged to make use of their PLEs in business cooperation. Students of massage therapy and students of hospitality and catering services were encouraged to use their PLEs for demonstrating their vocational skills. These were suggestions, not obligatory requirements, and students were free to design their environments in ways they wanted.

3.2. Methods and analysis

The analysis for this study was based on forms of content analysis, specifically document and artefact analysis (Savenye & Robinson, 2005). Document and artefact analysis uses the material created by the target group. According to Savenye and Robinson (2005), research material can be for example written materials, materials created in online environments etc. In this study the materials were students' descriptions of their PLEs and also the actual personal learning environments. Students' wrote their descriptions of PLEs after the first semester of using them ($N = 33$). Students could compose their descriptions by writing ($N = 23$), using PowerPoint ($N = 4$) or by screen capture videos ($N = 6$). The length of the descriptions varied from one half to two pages of A4. Video descriptions were typically 5–10 min long. The main requirements for making the descriptions were that they should deal with their own aims of their PLE and the content of the PLE. Also, students were asked to describe their experiences of using a PLE in the descriptions. In addition to these descriptions, the actual PLEs were used to provide more detailed information. The analysis also contains numerical information about the frequency that students mentioned different functions and purposes of PLEs.

The first phase of the analysis involved reading through documents and watching presentations in video format. This was done several times in order to get an overview of the PLE environments. The descriptions from documents and presentations were coded using *Atlas.ti* software. Coding was conducted without pre-defined categorisations; the aim was to allow for emergent features of PLEs and their use. Codes were named freely, based on the first ideas that came when reading the descriptions or watching the presentations. This phase yielded 44 different codes. The next phase was condensing and consolidating the codes. This yielded four different functions and purposes of PLEs and three categories describing the challenges of PLEs. Functions and purposes of the PLEs were '*Mirroring the conventional learning environment*', '*An environment for reflection*', '*An environment to showcase skills*' and '*An environment for collaboration and networking*'. Categorisations describing the challenges of PLEs were '*The PLE as a compulsory task*', '*Challenges with collaboration*' and '*ICT skills and use of time*'. In addition to students' descriptions of their PLEs, the actual PLE environments made by students were used to validate the analysis and provide more evidence for the categorisations. This was done by going thought the PLEs after the categorisations in order to confirm their alignment with the ways the functions and purposes of PLEs were built.

4. Results

This section provides an insight into the first versions of students' PLEs. The aim is to describe the PLEs the students built and the challenges related to using them. Quotations from students in *italics* below are verbatim, i.e. the English is uncorrected.

4.1. Software used and personalisation

At the beginning of the project, teachers suggested *Ning* as a platform for building the PLE for those students who were unsure about choosing software for their environments. Even though *Ning* was only a suggestion and students were free to choose the software they wanted, most chose *Ning* as a platform for their PLEs. The exceptions were the computer science students who all built their PLEs on a web

page or blog and linked different social software to their environments. None of the computer science students chose to use *Ning* whereas all the rest of the students did choose it.

The students who chose *Ning* personalised their environments with different frame images and different tools and linked in other software. *Ning* can be modified by appearance, functions and content. Students took advantage of these possibilities and modified the appearance and functions of their *Ning* environment. In addition, students were willing to share and present more personal information. A common way to add a personal touch to a PLE is to publish photos and videos and, for example, links to students' hobbies. In other words, in addition to studies, these PLEs included less formal material introducing students' areas of interest. For example:

Gallery is about my hobbies i.e. photography, the gallery bring up my work I want to share with other people.
The section "About me" is meant to tell about me in more convivial way and tell more about me than my CV. (Section includes information about my hobbies, favorite movies, TV-series etc.)

The appearance of the students' PLEs varied according to the ways they modified their environments and the software they used. Typically the outlook of the PLEs was like a portal containing several pages with content made by the students and also different elements providing more interaction and functions like discussion forum, areas for commenting etc. Navigation was either at the top of the page or on the left margin.

4.2. Functions and purposes of PLEs

This section summarises ways students described their PLEs and uses of PLEs evident from viewing the PLEs themselves. Outcomes are presented as approaches to the functions and purposes of PLEs.

4.2.1. Mirroring a conventional learning environment (N = 9)

There was a tendency to view PLEs in a similar way to conventional LMSs. In these cases, students built their PLEs to contain areas for different courses and practice periods. Students uploaded their learning tasks and assignments to their PLEs so that their teachers could comment on their work and give feedback. Also, these PLEs usually contained specific areas for working in groups. For example:

My PLE is built using the NING environment and at the moment it consists of several tabs named after different courses (for example "basics of nursing"), each containing sub pages (for example methods of nursing, first aid) containing different amounts of returned assignments and reports of courses.
I do my learning assignments in to my Blog so that teacher can read them and give feedback.

As students were familiar with *Moodle*, it seems that they resorted to similar ways of using the ICT for learning. Also, PLEs of this type were designed following the curriculum. PLEs contained separate subpages for separate courses and practise periods including particular areas for learning assignments, commenting, working in groups etc.

4.2.2. An environment for reflection (N = 6)

Another approach to the PLE was to design it as a platform for reflection. This type of PLE usually consisted of blogs or other similar tools suitable for sharing a student's thoughts and communicating with both teachers and other students. The aim of the reflective dialogue with teachers and peers was to deepen the learning experience. For example:

…during the practice periods the PLE brought new elements for learning and especially for reflection, when you wrote your experiences online and also teachers wrote their comments.
The aim of my PLE is to collect materials and assignments from different courses as a one package.
The aim is to deepen my understanding by stopping to think over new contents and skills and feedback from teachers related to courses and practice periods.

This type of approach to the PLE was often linked to different projects that students completed. Students used their PLEs as a diary where they reported the development of their projects:

I have been writing the project blog…. the intention is to keep writing it to the end of the project.
The aim is to tell how the project is proceeding… to provide some information about the aims of the projects, about the proceeding of the project and about the results of the projects.

4.2.3. An environment to showcase skills (N = 11)

Another approach to PLEs was to design and use them as showcases for skills and know how. These PLEs typically consisted of a CV and a large portfolio of students' assignments and projects and included pictures and videos of students' project work. Students intended to use these PLEs in applying for a job, as 'advertisements' for their skills. For this purpose, the PLEs were designed to be open to the public and the layout and content were especially directed to employers. For example:

With my PLE I am trying to express my personality, to show openness and that way reliability. In my opinion PLE is a combination of virtual business card and portfolio plus something extra.
I have not really put any specified goals for my PLE, but I am trying to create environment that would provide a positive picture about me and my skills. I am looking forward for seeing the possibilities of PLE as tool for applying job and for recruitment.

4.2.4. An environment for collaboration and networking (N = 33)

All the PLE environments contained some kind of tools for communication. In the simplest form these tools were links for email. On the other hand there were PLEs containing areas designed and built as platforms for collaboration and networking. These PLEs contained tools

for collaboration and communication, i.e. blogs with easy means of commenting, discussion forums, and areas for group work. These elements indicated students' expectations for active communication, collaboration and interaction. For example:

…as platform where institutions, students and people in general could access information, share knowledge, interact with friends and maintain profiling about his/her life engagement or activities.
Collaboration in my PLE has made easy as possible although collaboration has not been very vivid. PLE is open for everyone, so that everyone can leaf it through and write their comments.

Students also seemed to find it important to establish contacts with potential employers, colleagues, even possible customers:

With PLE I can build connections with the people working in the same trade.

Even though each student brought up the collaborative element, the collaboration was still seen as difficult (see Section 4.3.2.).

4.3. Challenges with PLEs

Experiences after the first year of the project were quite positive. However, there were challenging issues in the process of transferring from teacher-led environments to environments that students created themselves. The biggest challenges related to collaboration. There were also challenges connected with the PLE as a compulsory task and difficulties with ICT.

4.3.1. The PLE as a compulsory task (N = 4)

Although participation in the project was voluntary, once the students had agreed to participate the PLE task was compulsory. Although students had quite positive opinions and expectations about PLEs, some students ($N = 4$) did not find the idea of a PLE appealing. Students received one credit for building a PLE and it seems that for these students the credit was the only motivation. These students made their PLEs with minimum effort, only what they had to do in order to get the credit. All of these students used the *Ning* environment, following the suggestion of the teacher. Their PLEs showed little or no additional features of personalisation and the environment settings were often close to the *Ning* default settings. These students typically reported that they used the PLE only rarely. For example:

The reason for building my PLE is that I have to. I make just the things that are compulsory.
I don't believe this whole PLE idea. In my opinion this kind of projects does not belong to the health care area, especially for adult education. The time I spent with designing PLE could have been used for real learning.

4.3.2. Challenges with collaboration (N = 12)

Initially, students were keen to design environments for interaction and collaboration with peers, teachers and possible employers. Even though their intentions were towards active collaboration, realisation of this proved a problem. Students reported that despite making an effort by writing in their blogs and launching discussions, interaction was minimal:

Even though I have asked several people to post comments to my PLE, I have not got any comments.
Interaction between my peer does not work.

One reason for the minimal communication seemed to be the *Ning* environment itself. Students indicated that *Ning* is not suitable for collaboration; instead, *Ning* environments work as separate entities where users log into each other's environments to see the work. As a better option, students suggested for example a *Facebook*-like system where it is possible to see a stream of each other's postings on log-in:

Collaboration has not worked as I expected. Messages in my PLE do not show in other students PLEs.
It is difficult to use. It would work better if the environment would be like in Facebook where you can see each other's environment just by clicking his name without extra logging. When you want to see what other students have done you have to sign in again

4.3.3. ICT skills and use of time (N = 4)

Students also brought up problems with ICT and lack of time. In addition to problems with the *Ning* environment, some students reported that their ICT skills were not sufficient for building a PLE. Students thought that the time spent with the PLE was used mainly for learning how to use different software. Students also reported that building PLEs was very time-consuming. With tight schedules, this was considered a problem. For example:

The time spent with PLEs could have been used for learning the contents of my own field.
Building PLE demands more time, especially when ICT skills are not very good.

5. Discussion

The results of this study provide an insight into the experiences of employing personal learning environments in a polytechnic and a vocational school in Finland. Out of the results emerge explicit approaches to PLEs that students opted for when given a free hand to design and build their own environments. The PLEs that students put together often resembled traditional learning environments, such as *Moodle*, with which students are familiar, but they also typically included additional elements supporting reflection, networking and collaboration. The layout of the PLE often included elements of personalisation through which the students highlighted their persona and skills and shared their private interests such as hobbies etc.

The results correspond to some extent with the characteristics of PLEs described by Downes (2010) and Attwell (2007). According to them, PLEs typically include tools for, e.g., producing and publishing materials, communication, collaboration and scaffolding learning. The

Ning environment contains several tools for multiple purposes and it seems that typically students took advantage of them. However, contrary to the ideas of Downes (2010), students in this study made little use of tools for searching and aggregating material and resources.

A basic expectation in the idea of PLEs in education is that students are able to build their learning environments independently and freely, making decisions about tools and content based on their own learning needs and purposes (Attwell, 2007). Also, most of the target group ($N = 24$) in this study were under 30 years old i.e. they were of the net generation, indicating that we might have expected more innovative use of different software (cf. Tapscott, 2008; Jones, Ramanau, Cross, & Healing, 2010). The results, however, suggest that these expectations should be treated with caution. For example, students resorted to the teacher's suggestion of using *Ning* in building their PLEs even though they were free to choose any software they wanted. Only students of computer science built environments using a wider range of software or programmed their own environment. Also, ideas suggested by teachers regarding the functions and purposes of the PLEs could be seen in the students' PLEs. The results of this study, as with those of Kvavik (2005) and Valtonen et al. (2011), question common assumptions about the net generation's innovativeness with ICT.

Designing and building PLEs raises questions about students' awareness of their own learning. Students must be familiar with the ways in which they learn in order to be able to choose the appropriate tools and content to support learning through their PLEs. According to Hakkarainen et al. (2004), this kind of metacognitive thinking, i.e. planning, controlling and evaluating the learning process, has typically been the teachers' responsibility. If learning is mainly externally regulated, i.e. the process is teachers' responsibility alone, how can students' develop metacognitive skills and skills for self-regulation of learning? According to Taylor and Burgess (1995), learning methods stressing students' central role require adequate support and orientation.

Our argument is that the skills students need for self-regulated learning cannot be taken for granted but need to be incorporated into the design of PLEs and the pedagogical support around them. This demands especially active roles on the part of teachers as experts in pedagogy and learning. Teachers should provide support for the critical elements of learning. Especially as students begin to use PLEs different activities known to support learning, based on current research should be integrated more concretely into the courses. Students should be encouraged to undertake activities like evaluating their own learning, commenting on the ideas of their peers, bringing up their interpretations, evaluating their learning methods etc. and to conduct these kinds of activities using their PLEs. As they begin to use the PLEs, the reasons for these kinds of activities should be discussed. With these practical interactions students should get more support for developing their learning skills and gain more insights into their PLEs and ideas for using them to support learning.

Results show that peer collaboration and interaction via PLEs is not always easy to establish. Mott (2010) suggests that to enhance learning, individual PLEs should constitute an actively interacting network where students' ideas and learning spread automatically via *RSS* or other similar technologies. This suggestion is also shared by Attwell (2007) and Downes (2005). The results of this study indicate that even though students aimed for collaborative activities, collaboration in practice was difficult. One reason for the challenges with interaction and collaboration was the *Ning* environment which does not allow viewing the postings or activities of others without first logging into their specific accounts. Students found this tiresome.

Taken together, the challenges relating to students' metacognitive thinking and self-regulation, along with the challenges of collaborative learning practices, suggest that instead of a focus on technology, the emphasis ought to be on the pedagogical demands of PLEs in education. From this perspective the distinction between PLEs and LMSs is not necessarily relevant. If LMSs and teaching methods allow also students to administrate and customise the environment for their learning needs the difference is minimal.

After the first year with PLEs, the work continues in the participating school and polytechnic: students are developing their PLEs further building on their initial experiences and ideas. Even though the results after the first year brought up challenges related to the use of PLEs, they also revealed encouraging trends. Most of the students found designing and building their own PLE meaningful and rewarding. Our assumption is that with adequate pedagogical support from teachers, students can potentially make use of PLEs for learning and thus develop their metacognitive and self-regulative skills, the skills needed for the knowledge society and information age (cf. Hargreaves, 2003; Sahlberg, 2010; Scardamalia, 2001).

This study provides an insight into students' approaches to designing and building PLEs and at the same time reveals how the assumptions related to using PLEs in education are not necessarily reflected in practice. Using PLEs in education is a fairly new phenomenon and thus it needs further research. Within this project, the next step is to see how students' PLEs and learning practices evolve during a further two years: will students continue the use of PLEs, do they find them useful? The next research theme will concentrate on teachers. How does the role of the teacher develop? What kind of support can they provide without handing students 'ready-made' models? What type of pedagogical support is appropriate for PLEs? Should the teacher have his or her own environment for consulting students' learning needs and how should it be connected to the network of students' PLEs: what form should the *interface* between students' and teacher's learning environments take?

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