**The author's name.**

Alexey Panin

**Topic of the thesis.**

Personal learning environment adoption by teachers in primary and secondary schools

**Supervisor (s).**

Dr. Nan (Andy) Zhang  
Assistant Professor,  
Department of Computer Science and Information Systems  
Faculty of Information Technology  
University of Jyväskylä

# SUBJECT

## Situation in the field of education in Europe

According to Lang et al. (2012), the field of Education in Europe confronts several mayor challenges such as early drop outs, financial issues, teachers spending less time with the students due to documentation, the shift into 21st century skills both for teachers and students, low interest in STEM subjects (Science, technology and Math) as well as an increased demand of personalized learning.

Apart from this we are facing a **great shift** within our Education systems and our teachers need support from technology to manage this shift from the traditional school to e - teaching and learning.

There exists a great amount of different ICT solutions on the market to be used in our classrooms but in spite of high investments and a market that offers such a variety of products we still confront a low use of technology to perform innovative teaching and creative learning in the European classrooms in order to meet the 21st century in full scale.

It is believed that our actual situation and problems have one common origin – the lack of customized ICT products/ services merging from the demand side (our European schools) and an effective dialogue between demand and supply side (procurers of ICT and ICT industry/ research).

## Innovative Methods for Award Procedures of ICT learning in Europe (IMAILE) project

In order to improve the described situation partners in Sweden, Finland, Germany, Hungary, Austria, Portugal and Spain together has developed the IMAILE project based on the PCP method (Pre – commercial – procurement), an instrument recommended by the European Commission that stimulates a dialogue between public procurers representing the demand side and industry/ SME (Small/Medium Enterprises) as suppliers on the other side.

IMAILE consortium has identified and decided to focus upon the challenge of an **increased demand of personalized learning** where new technology should support schools and teachers in an innovative and creative way.

As shown on figure 1, PCP process is divided in three phases: solution design exploration, prototype development and proof of concept (original development of limited test series) for the provision of R&D services.

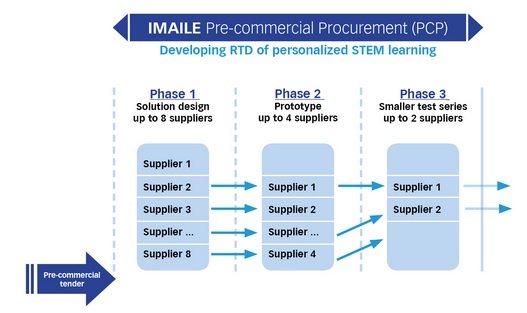


FIGURE 1. IMAILE Pre-Commercial Procurement (IMAILE portal)

According to requirements of IMAILE, the suppliers should provide innovative solutions of the next generation **PLE** (personal learning environment) that address students in primary and secondary school in the topics of Science, Math and Technology (STEM) and that support different learning styles with the following personal content:

* Content and digital curricula of STEM topics, self-assessment
* Tools for collaboration, communication, cooperation with others
* Classroom management (interaction with teachers for planning and selecting the tools, assessment according to 21st century skills)
* Connectedness, parents, wider community, other students

The challenges what IMAILE project addresses can be divided into several **sub challenges** **related to direct or indirect impact in the fields of pedagogy, technology and society**:

* **Challenge 1**  
  Full implementation of personalized STEM learning approach for all students including SEN (Special Education Needs) support
* **Challenge 2**  
  Increase STEM motivation and students results by using TEL (technology-enhanced learning) solutions
* **Challenge 3**  
  Technology applicable to all devices, interoperability and scalability of innovative digital solutions
* **Challenge 4**  
  Labor market and increased demand of STEM professionals 2025
* **Challenge 5**  
  Costs and risks of early school leavers for EU Member States

(IMAILE portal)

## STEM scope of the IMAILE project

While STEM stands for Science, Technology, Engineering and Mathematics, the IMAILE project will focus on the aspects of Mathematics and Science and more particular Mathematics, Biology, Chemistry and Physics. This is based on the availability and comparability of these subjects and related topics within the procuring countries as well as on the reduction of complexity. Within the IMAILE Project, STEM should thus be understood as subjects and topics related to Mathematics, Biology, Chemistry and Physics.

(IMAILE portal)

## Personal Learning Environment (PLE):

Personal Learning Environment is quite a new concept and it has usually been described as a concept not as a learning environment. In the scholar literature there are attempts of giving a definition of PLE as a learning environment and some of them can be found in the table 1.

TABLE 1 Definition of PLE

|  |  |
| --- | --- |
| PLEs are an outcome of the tools that social media has provided learners enabling them to create, organize, and share content | Martindale and Dowdy, 2010 |
| PLEs are externally hosted (in-the-cloud) Web 2.0 tools and services designed to help students aggregate and share resources, participate in collective knowledge generation, and manage their own meaning making | Dabbagh & Reo, 2011; Dron, 2007 |
| PLEs are tools, communities, and services that constitute the individual educational platforms that learners use to direct their own learning and pursue educational goals | EDUCAUSE Learning Initiative (ELI), 2009 |
| PLEs are systems that empower students to take charge of their own learning prompting them to select tools and resources to create, organize and package learning content to learn effectively and efficiently | McGloughlin and Lee, 2010 |
| PLEs can be perceived as both a technology and a pedagogical approach that is student-designed around each student's goals or a learning approach chosen by a student to match his or her personal learning style and pace | Dabbagh & Kitsantas, 2012 |

An easy to understand definition of PLE as a learning environment can be found also from Wikipedia which moreover largerly conforms ideas about PLEs from scholar literatures and which in used in the official IMAILE document “State of the art in Personal Learning Environments” written by Lang, M. Lounaskorpi, P. Pardo, A. (2012). Thus, in this work PLE refers to the following:

***“Personal Learning Environments (PLE) are systems that help learners take control of and manage their own learning. This includes providing support for learners to:***

* ***set their own learning goals (with support of their teachers)***
* ***manage their learning, both content and process***
* ***communicate with others in the process of learning “***

***(Wikipedia)***

## PLE in IMAILE project (PLEI):

Although general definition of PLE is given, it is still needed to specify what PLE means in the context of IMAILE project.

According to information found on the official portal of IMAILE project, the definition of PLEI is the following:

***“The Personal Learning Environment in IMAILE (PLEI) for STEM is an adaptive, accessible, and easy to use solution providing smart services for the realization of personalized learning including individualized learning paths, support of different learning strategies, and intelligent tutoring for primary and lower secondary schools. The IMAILE PLE for STEM shall offer a single access point to repositories of freely available learning content, learning apps, services and tools for STEM education through the application of open standards. Through the provision of own communication and collaboration functionalities and the integration with widely used social media pages, the IMAILE PLE enables students to learn, share and interact with their friends, teachers, and other stakeholders such as their parents. The IMAILE PLE supports bring your own device (BYOD) through the provision of a device and operating system independent solution, and lifelong learning through the integration of an ePortfolio solution.  Overall, the IMAILE PLE for STEM provides a highly motivational environment for formal and informal STEM education.”***

***(IMAILE portal)***

# MOTIVATION

Structure of section:

* Shift from teacher centered approach to student centered in education
* Situation with student centered approach within STEM subjects in European schools
* Importance of PLE (X)
* Problems of existing PLEs (X)
* Methods to improve PLE (X)
* There are works about ITC adoption in education but not yet particularly about PLE in the context of primary and secondary schools

## Shift from teacher centered approach to student centered in the field of education

…

## Teaching approach within STEM subjects in European schools

European schools at present show a **teacher centric** classroom with teachers using technology, interactive whiteboards and LMS systems. While the actual trend goes to towards **student centred** learning where all students have access to devices, digital content and software in a personalised way.

Research indicates that interactive classrooms need the support of ICT personal learning environments in order to provide participatory learning in a student centric way.

By marrying the principles of personalised learning with the tools of technology some educators believe that they have the chance to create the kind of customized learning environment that can finally break schools out of industrial age model of education to bring the true 21st century school reform.

(IMAILE portal)

## Importance of PLE?

According to IMAILE vision, PLE helps in the following:

* A personalised learning environment increases the students’ motivation and creates a learning situation where they can control their own learning at their own pace.
* It allows students to actively in design their own learning strategies
* PLE enables better contact between student/teacher, and the education is less teacher-centred.
* PLE and modern technology together create a customised learning environment that suits the development of the 21st century classroom.
* The technology of today makes it possible to create PLE solutions which are developed to suit the demands from both teachers and students.
* PLE in combination with technical tools increase the students’ interest in STEM subjects, which is important as there is a growing demand in STEM related professions.
* The young generation of today primarily learn by being interactive. This requires interactive classrooms with personalized ICT solutions.

(IMAILE portal)

### The importance of PLEI:

Pupils of K-12 (primary and secondary schools), for whom PLEI is intended, need support in their studies the most because they are still so unexperienced, not mature and having their heads twisted because of large amounts of new information and choices of professions for the future career. Thus learning support and responsibility of the entire process lies on the shoulders of teachers and parents. New PLEI dares to help teachers in their daily work and give a hand to students and their parents guiding them through the dark forest of education.

A new PLEI should help solving above mentioned challenges because it should meet the following requirements which were defined by IMAILE:

* Create more 1 to 1 meetings between teacher and student in the classroom.
* Reduce teachers planning hours.
* Increase students’ motivation to learn STEM.
* Create a real shift from teacher centered learning to student centered learning ( research shows that lessons in math and science still is mostly teacher-centered, with few opportunities for the students to have influence on their own learning and using digital tool).
* Be applicable to all devices (responsive design for computers, mobile phones, tablets…), our PLE solution should be a tool that can be easily used from the students’ personal devices as well.
* Be applicable to all learning styles according to the Learning and Teaching Styles (Felder & Silverman, 1988): active/reflective, sensing/intuitive, visual/verbal and sequential/global.
* Provide students with a personalised formative feedback and scaffolding, based on their learning paths, needs and styles.
* Reduce the numbers of early drop outs in a long term perspective

(IMAILE portal)

## Problems of existing PLEs:

The world of e-learning and using ICT in education is full of solutions and online environments. Most of them have a long history behind them and have had excellent user experiences reported. The dawn of the social age has driven more solutions, software and services to support learning processes and personalizing the learning. New pedagogies and working approaches have innovated teachers and researches to create their own solutions and vision of PLE.

The challenge of the existing solutions and software to support PLE is two-fold. Firstly the solutions focus on only some of the features that PLE needs and on the other hand they are mostly mended to university users (young adults) who can take the responsible of their own learning.(Lang et al, 2012)

Table 1 shows the analysis of some of PLE technology solutions existing on the market.

TABLE 1 ANALYSIS OF EXISTING PLE SOLUTIONS (Lang et al, 2012)

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Source** | **Description** | **Shortcomings** |
| Gooru | http://go.nmc.org/gooru | STEM education research, search, and curation portal that relies on crowd sourcing and collective intelligence | This service is a search engine and not applicable on the target groups Primary and Secondary schools. |
| The Learning Hub | http://go.nmc.org/yokoh | Each student has their own blog that develops into their electronic portfolio and personal learning environment. | This solution does not support teachers and students to assess and select tools according to their learning methods and personalized needs. |
| LTISD Learning Portal | http://go.nmc.org/ltisd | Students have 24/7 access to a webbased learning environment from school, home, and their mobile devices | This is a learning portal learning management system (LMS) and not specific a PLE. |
| The PLAYground | http://go.nmc.org/thepl | Online platform for the curation, creation and circulation of user generated learning activities that encourages children and adults to learn and teach each other. | This solution does not support teachers and students to assess and select tools according to their learning methods and personalized needs. |
| Shared Learning Collaborative | http://go.nmc.org/shared | This project is developing a common data layer and  encouraging independent software vendors to build personalized learning applications for five pilot states in the US. | The project is not a holistic approach. |
| Trail Shuttle | http://go.nmc.org/trail | Self-directed learning platform that uses technology to enable students to build their own learning programs | Not PLE but Learning Management System (LMS). |
| Peda.Net | http://peda.net | Peda.Net is user-based platform, which is building around the personal learning place. It is a PLE platform for students and teachers. | The weakness of online tools, evaluation system and big data collecting still need development. |
| Mentorixx | http://www.mentorix.eu | Mentorixx offers a flexible, dynamic and interactive learning platform, facilitating the process of building internal or external training sessions! Mentorix Learning also includes social networking, where communication is central, to broaden the interaction and learning between staff and trainers. | The interaction with the parents and big data collection are the weak points of the platform. |

The overall conclusion from the scanning for PLE for the K-12 education is that the market doesn’t have yet fully functional PLE–platform to be recommended. The vide implementation of new pedagogies, equipment and methods challenge the market. The new needs from the primary and secondary education students, teachers and parents can’t be answered platform which have been created for universities in the first hand. (Lang et al, 2012)

TODO: Analyze tools widely used in Finland: Pedanet, Officer365, Wilma, SanomaPro (based on Desire2Learn)

## Method to improve PLE:

As the analysis above showed, there are great solution already on the market and by combining their features on it is possible to create a vision of the future PLE.

According to IMAILE recommendations a PLEI should utilize (all or partly) those emerging technologies which are nowadays in trend of technology enhanced learning:

* Cloud computing
* Wearable technology
* OER
* BYOD
* Blended learning
* Gamification
* Learning analytics
* Automated online assistant

Choosing this particular topic has first of all a practical reason – to benefit the company I am working for – Almerin Ky. Almerin was founded as a response to appearing on the horizon of the IMAILE project, the project on a European level which addresses the area of ICT in the field of Education and e-learning. During personal chat with CEO of Almerin company, he said that the challenges what IMAILE project addresses (listed below) worries him too, and being a father of two kids, he felt like proactively doing something about it. So after he found out information about IMAILE, he established the company and applied for participation in the project. Since in the very beginning he had very talented people in the team, the whole company managed to get selected as one of the suppliers of ICT solution for IMAILE.

Almerin in its development of PLE utilizes most but not all of these technologies but thanks to the fact that new PLE is being developed as a platform **(n-side market)**, it makes it possible to cooperate with third party companies and integrate their solutions into the new PLE which are in their turn utilizing the rest of above mentioned technologies. This way Almerin ensures that all parts of the puzzle are on place and a new PLE is going to correspond to 21st century personalized learning demand.

While new PLE in being developed, it is already clear that the development of it results in innovation and the biggest challenge with a software, and especially with that software which includes something totally new, is to sell it to actual clients. For pupils to be able to get all mentioned above advantages of using a new PLE, it is necessary that schools adapt it in their teaching activities. Thus Almerin clients are actually schools and to be more particular – teachers, who will actually be using the new software and whose opinion has a big weight in schools’ overall decision on whether to take it into the use or not. That’s why I want to study primarily teachers in the context of adoption of a new PLE. As a result of my research I want to find answers on the basic question of ‘why teachers would want to adapt new PLE in their teaching activities?’ in order for Almerin to use these answers as arguments in their selling campaign.

## Previous studies of ICT adoption in education

There are many researches made to study ICT adoption in schools but there is still a gap in the knowledge, namely the PLE adoption in the context of primary and secondary schools.

…

# Preliminary research questions.

Why teachers in primary and secondary schools would want to adapt a new PLE in their teaching activities?

More elaborated version:

**Why would teaching personnel of primary and secondary schools be willing to adapt completely unknown and commercially distributed PLE (product of Almerin) in their teaching activities while there is a great variety of freely distributed learning management systems (LMS) available on the market.**

* what could motivate them to start using it?
* What challenges teachers experience while using existing tools?
* What issues teachers would want to have solved while using a new technology?

# The research method, if it can already draw.

To be decided with the supervisor. My personal thought is to go with quantitative research method, create a survey and send to several schools.

# A few scientific sources.

* Felder, R. M., & Silverman, L. K. (1988). Learning and teaching styles in engineering education. Engineering education, 78(7), 674-681.
* Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance

of information technology: Toward a unified view. *MIS Quarterly,*

*27*(3), 425–478.

* Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer acceptance and use of

information technology: Extending the unified theory of acceptance and

use of technology. *MIS Quarterly, 36*(1), 157−178.

# Capacity to carry out the work.

My advantage in doing a research on the chosen topic is that I actually work in that company, so I have a possibility to collect more realistic data and have deeper insights. But what is my advantage can be a disadvantage as well: due to the work schedule, I have a limited time what I can dedicate for my theses writing, about 10 hours a week. Starting from next February this amount might be even smaller as I intend to be working full time. But my motivation to finish my theses by the end of 2016/2017 academic year is high, so I will do my best to make it happen.

References:

Lang, M. Lounaskorpi, P. Pardo, A. (2012) State of the art in Personal Learning Environments (incomplete)

Martindale, T., & Dowdy, M. (2010). Personal learning environments. *Emerging technologies in distance education*, 177-193.

Dabbagh, N., & Reo, R. (2011). Impact of Web 2.0 on higher education. In D. W. Surry, T. Stefurak, & R. Gray (Eds.), Technology integration in higher education: Social and organizational aspects (pp. 174–187). Hershey, PA: IGI Global.

Dron, J. (2007). Control and constraint in e-learning: Choosing when to choose. Hershey, PA: Idea Group.

EDUCAUSE Learning Initiative (ELI) (2009). The seven things you should know about… Personal Learning Environments. Available from. <http://net.educause.edu/ir/library/pdf/ELI7049.pdf>

McGloughlin, C., & Lee, M. J. W. (2010). Personalised and self regulated learning in the Web 2.0 era: International exemplars of innovative pedagogy using social software. Australasian Journal of Educational Technology, 26(1), 28–43.

Dabbagh, N., & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. ***The Internet and higher education*,** *15*(1), 3-8.