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Personal learning environment adoption by teachers in primary and secondary schools

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# SUBJECT

## Tendency towards Student – Centered learning

Problem of teacher centered learning

## 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 there is a great shift from the traditional school to e - teaching and learning going onwithin the European Education system and the teaching staff need support from technology to manage this shift. There exists a great amount of different ICT solutions on the market to be used in classrooms but in spite of high investments and a market that offers such a variety of products it is still observed 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 European schools’ actual situation and problems have one common origin – the lack of customized ICT products/ services merging from the demand side (European schools) and an effective dialogue between demand and supply side (procurers of ICT and ICT industry/ research).

(IMAILE portal)

### 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)

## 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.

(IMAILE portal)

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.

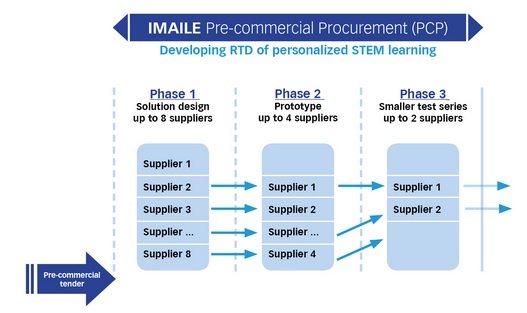


FIGURE 1. IMAILE Pre-Commercial Procurement (IMAILE portal)

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

In detail expected solutions should:

* Support all students to reach their goals in a personalized way.
* 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, revised in 2002): 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)

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)

## Almerin – official supplier of ICT solution for IMAILE

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. As a motivation for starting the company, CEO of Almerin told that the challenges what IMAILE project addresses 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.

## 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

## Importance of PLE

The concept of the PLE has been emerging in recent years via the work of online theorists, researchers, and developers, as the result of the limitations of learning management systems, a recognition of the importance of informal and lifelong learning, and the growth of social software. (Martindale & Dowdy, 2010)

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 primarily 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.
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* 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)

## 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. And that’s what Almerin does in its activities. Instead of inventing something completely new, Almerin decided to extend the functionality of one LMS solution called Sakai which is the open source. The reasons of choosing Sakai instead of others is not subject of this work and will be left behind the curtains.

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
* Social media
* Learning analytics
* Automated online assistant

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.

## Previous studies of ICT adoption in education

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

(give examples of different works)

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 a new ICT solution into the use or not. That’s why the goal of this work is to study primarily teachers in the context of adoption of a new PLE. As a result, this research it is wished 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.

# Preliminary research questions.

**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.

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# 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.

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TEMP:

The concept of student-centered learning is to bring the classroom and students to life. The

teacher is considered a “guide on the side”, assisting and guiding students to meet the goals that have

been made by the students and the teacher. (Overby, 2011)

Intro

The premise "one teaching style fits all," which is attributed to a teacher-centered instructional approach, is not working for a growing number of diverse, student populations. New challenges facing classroom teachers: legislative mandates for school renewal, diverse student needs, technological advances, and school violence prompted this researcher to look for an alternative. Examination of the literature detailed the assets of teacher- and learner-centered approaches for meeting the challenges of 21st century teachers (Brown, 2003)

With teacher educators, problems occur when teaching styles conflict with student learning styles, often resulting in limited learning or no learning (Brown, 2003)

Learner-centered classrooms place students at the center of classroom organization and respect their learning needs, strategies, and styles (Brown, 2003)

In learner-centered classrooms, students can be observed working individually or in pairs and small groups on distinct tasks and projects (Brown, 2003)

Learner-centered approach

An essential factor for a learner-centered approach is placing the learning characteristics of all learners under the microscope with specific emphasis on low-performing learners (Brown, 2003)

McCombs (1997) explained that the locus in a learner-centered approach is on individual learners' heredity, experiences, perspectives, backgrounds, talents, interests, capacities, and needs.

Teacher-centered approach

The teacher-centered approach is associated chiefly with the transmission of knowledge. McDonald (2002) clarified the definition by saying that the work of teachers depends upon the abilities, skills and efforts of their students. Student achievement is at the forefront of teacher-centered curriculum, but teachers are driven to meet accountability standards and often sacrifice the needs of the students to ensure exposure to the standards. (Brown, 2003)

Teachers in a teacher-centered environment focus on making relationships with students that are anchored in intellectual explorations of selected materials. They focus more on content than on student processing. (Brown, 2003)

Semi conclusion:

Both approaches recognize the student as a key factor in improving student achievement. The teacher-centered approach places control for learning in the hands of the teacher. The teacher uses her expertise in content knowledge to help learners make connections. The effort to get to know the learner and how he processes information is secondary. The learner-centered approach, however, places more of the responsibility for knowing individual learner capabilities and creating an environment where learners can make learning connections. Similarly the onus for achieving is shifted to the student. Teachers provide a variety of instructional methods and techniques for helping learners construct their learning and develop a system for applying knowledge and theory.

Teaching-Centered Environments

Direct instruction is the predominant instructional practice used in the teacher-centered approach. Instructional schedules and urgency to comply with legislation do not allocate time for teachers to pose open-ended questions or to work on problem-based projects. Boyer (as cited in Perkins, 1993) reported that one percent of instructional time is devoted to questions that invite thoughtful responses. However, the expertise that teachers bring to the learning context cannot be underestimated. They see the big picture and have a command of the content. Traditionally, teachers decided what students would learn and how. Orchestration in traditional classrooms is limited because student interaction is basically responding to teacher-directed questions. Rarely do students construct their own learning; achievement is measured on objective tests. (Brown, 2003)

Learning-centered

Tomlinson (2000) adds that the differences in students are significant enough to make a major impact on what students need to learn, the pace at which they need to learn it, and the support they need from teachers and others to learn it. (Brown, 2003)

 With the learner-centered approach, teachers bring command of content knowledge but design flexibility for learners to construct their learning. Learner needs and characteristics take precedence over knowledge of facts and skills; the emphasis is on engaging learners in learning for understanding and thinking, to help them build their own interpretations. Teacher narratives and the emphasis on learner characteristics make the learner-centered approach a viable alternative for matching teaching practices with learner needs. (Brown, 2003)

Reflecive inquiry

In teacher-centered environments, reflection is manifested as limited discussion of content knowledge with a mentor or a small number of teachers. Thinking is basically the responsibility of the teacher; students memorize and recite information given by the teacher. McDonald (2002) explains that teachers make a crucial decision: they decide what they want their student to understand. Students' performances show lingering misunderstandings and a need for further coaxing. Assessment points out deficiencies but does not offer processes for application in other situations. (Brown, 2003)

Thinking-centered learning

The goal of a learner-centered approach is to get students focused on thinking about the content they are learning (Perkins, 1994). Orchestration in the learner-centered classroom reflects a variety of ways for learners to acquire content. Students construct their learning by working collaboratively in study groups to solve authentic problems and to critique, defend, or explore alternative points of view. Students are encouraged to make meaning by producing projects that become the basis for teaching others what they have learned. Although students are active learners, the teacher's expertise is still a powerful part of the learning equation. (Brown, 2003)

Controlling how instruction is provided distinguishes teacher-centered from the learner-centered approach. Content and methods are handed down to teachers in the teacher-centered approach. Teachers do not participate in the crafting or implementation of curriculum. Usually, they are given directions by people who are not involved in instructing children and who often never knew or have lost sight of the dynamics that diverse populations place on classroom practice. (Brown, 2003)

In both approaches, teachers provide background data and content, and pose questions that students can use to create meaning. However, the diversity of teaching methodology, assessing the quality of the programs and learning that is an integral part of the learner-centered approach are ignored in the teacher-centered approach. Similarly, students' characteristics become the data that teachers use to match learning. Conversely, in the learner-centered approach the curriculum, although often commercially developed, is endorsed by the faculty; they make decisions about what is appropriate for their learners and select strategies that will work for their learners. Developers of learner-centered curricula are committed to seeing that teachers help students achieve and that teachers are provided experiences to help them grow professionally. (Brown, 2003)

 To support a learner-centered approach, stakeholders must support the ideology. Issues of societal change, alternative pathways to teaching, and the historical context of educational practices cannot be automatic (Brown, 2003)