

A SCENARIO FOR PORTFOLIO-BASED ACCREDITATION OF TEACHERS' COMPETENCES IN ESTONIAN CONTEXT

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Abstract: This paper focuses on the process of accreditation of in-service teachers' competences, which is used in some countries as career advancement option within profession. The accreditation process of senior teachers in Estonia is somewhat different compared with other countries, as the next career rank can be granted to an applicant only if she/he meets a number of formal measurable indicators. The higher career rank is valid just for five years, then it has to be re-applied or else teacher falls back to previous rank and salary level. We argue that current accreditation process does not support teachers' lifelong learning and knowledge building activities and does not make use of new technology (e.g. e-portfolio). Empirical study was conducted using participatory design method involving in-service teachers. The first iteration of design-based research process resulted with an alternative scenario for competence-based accreditation process involving use of digital portfolio. The paper also provides a conceptual model for learning and knowledge building with e-portfolio to support the new scenario of teachers' accreditation process.

1 INTRODUCTION

According to (Hargreaves, 2000) we are at a crossroad for teachers' professionalism and professional learning at the beginning of this century. One possible future scenario leads to diminished professionalism of teachers due to regulations, another scenario calls to maintaining and pursuing professionalism through teachers' participation. One option to promote teachers' professional growth is to provide an innovative learning and knowledge building model for teacher accreditation processes. (Bereiter and Scardamalia, 2003) define learning as an internal and practically unobservable process that results in changes of beliefs, attitudes, or skills. In contrast, knowledge building is defined as individual and social constructive process of creating new public/shareable cognitive artifacts, which reflect the formation of various forms of knowledge by individuals, groups and organizations (Bereiter & Scardamalia, 2003). In the context of this study, we refer to Learning and Knowledge Building together, using the acronym LKB. Such model serves not only as the extrinsic motivator to advance their career, but also contains intrinsic motivators for planning and maintaining personal competence development.

Several terms are used for teacher evaluation, such as teacher certification, accreditation and attestation. Certification is usually referring at the initial evaluation of teacher's professional competences in the beginning of professional career. Teacher certification and licensing systems exist to assure the public that practicing teachers have achieved a minimum level of competency, thereby ensuring that unqualified people are not practicing the profession (Heine, 2006). Teacher accreditation can be seen as a procedure for regulating career advancement within profession (Helleve, 2009) and/or for justifying the decision for experienced teachers' salary increase (Männamaa, 2005).

In this paper we focus mainly on accreditation process for experienced teachers, which supports the professional development and career opportunities of educators. This type of accreditation enables to periodically evaluate the efficiency of their work and conformity to the requirements of their rank on the basis of self- and external assessment. *'The Common European Principles for Teacher Competencies and Qualifications'* (2005) outlines a vision of an European teaching profession and according to this, teachers are expected to be lifelong learners who continue their professional development, learning and knowledge-building (LKB), throughout their

careers.

In this study we explore the in-service teachers in Estonian context. *'The Estonian Teachers' Qualification Standard'* emphasizes the importance of facilitating teachers' attitudes and understandings to be reflective practitioners and lifelong learners. The Estonian teacher is responsible for his or her own professional development and for identifying and planning personal learning needs (Eisenschmidt & Löffström 2008).

This study focuses on three research questions:

- What are the most critical gaps and controversies in current in-service teacher accreditation policy in Estonia?

- How these gaps and controversies can be addressed by switching to portfolio-based accreditation of teachers' competences?

- Which additional functionalities should be developed to the existing e-portfolio environment in order to support teachers' accreditation process in accordance with developed LKB model?

2 ACCREDITATION OF TEACHER COMPETENCES

Accreditation has been described as a public statement that a certain threshold of quality has been achieved or surpassed (Campell et al., 2000). In the context of our study, teacher accreditation is defined as a process of raising the career rank within the profession and which is based on external and internal evaluation. Accreditation can be based on qualification- or competence standards. Yet, there are critics, who find that standards are not the best possible solutions to evaluate teachers' performance. Thomas and Schubert (2001) believe that professional standards not only promote the "bureaucratization of teaching" but also skew the nation's ability to distinguish a quality teacher. For example Lee & Owens (2001) have pointed that there is a strong need for including performance tasks with licensure tests to measure teachers' competences.

The research conducted in the area of competences points out the wide diversity of the available definitions. It appears that there is no commonly agreed-upon definition of competence concept in the existing literature (Sampson & Fytros 2008). Competences are proved to be a critical tool in human resource management, vocational training and performance management. Sampson & Fytros (2008) define competences as personal

characteristics (e.g. skills, knowledge, attitudes) that an individual possesses or needs to acquire, in order to perform an activity within a specific context, whereas performance may range from the basic level of proficiency to the highest levels of excellence.

Although, there might be an argument that accreditation is more about minimum standards (be they academic, competence, service or organizational (Harvey, 1999), than about the quality of the process, still the accreditation decisions are, or at least should be, based on transparent agreed, pre-defined standards or criteria (Sursock, 2000).

Different countries have different requirements for teacher accreditation, and there is no common approach to evaluate teachers' achievements. Many countries have established professional qualification or competency standards for teachers. There are also different approaches to accreditation procedures, - body of responsibilities, and set of criteria. For example in Australia, the responsible body and the standards are on state level, whereas in United Kingdom, an executive non-departmental public body is responsible for accreditation, and teachers must meet standards for Qualified Teacher Status (QTS). QTS is organized in three sections (Professional Values and Practices, Knowledge and Understanding, and Teaching). The United States accredits teaching profession using school-independent professional standards developed and assessed by The National Board for Professional Teaching Standards (NBPTS) - a non-profit and non-partisan organization, where the most members are teachers. Also, The National Council for Accreditation of Teacher Education (NCATE), from US, accredits teacher education. The process is based on six standards, where two of them measure teacher candidates' performance. And the standards for knowledge, skills, and dispositions, the assessment system, and unit evaluation address the expectations set for the learning process and its final outcomes (Wise, 2005). The role of technology in NCATE accreditation is increasingly prevalent, and it is expected that technology will be more in use in assessment, planning, and evaluation (NCATE, 2006). Described ways to support teacher quality are complementary in the sense that performance management systems in schools ensure teacher quality in the workplace, and professional teaching standards explicate what is expected of teachers in terms of knowledge, skills and attitudes (van der Schaaf, 2005).

In Estonia, the teachers' qualification system is regulated by the decree of Ministry of Education –

system of teachers' accreditation, which prescribes requirements for accreditation process (Männamaa, 2005). The aim of teacher accreditation process is to support teachers' professional development and career possibilities, by periodical self-evaluation and external evaluation exercises. After the successful accreditation process, teacher will be granted one of the four ranks: novice teacher (rank is granted by national institution's committee), teacher (rank granted by school-committee), advanced teacher or expert-teacher (ranks are granted by national institution's committee). Once a higher rank is accredited to a teacher, all educational institutions in Estonia have to acknowledge it (Krull, 2001). The teacher's base salary is in direct correlation with the appointed rank.

The rank of an advanced teacher and expert teacher is accredited for 5 years to a teacher, but the rank of a teacher is certificated permanently to a person after graduation and effective one-year work experience at school. The project '*National development plan for teacher education 2006–2013*' compiled the description of the teachers' competences into the '*V*' *Standard of Teacher's Professional Competence*. This standard has been ratified by the Ministry of Education in Estonia, and serves as the basis for planning the professional development of teachers' initial training, induction year, and in-service training at school (Eisenschmidt, 2006).

Current Estonian national system does not seem to provide sufficient information for guidelines for the development of teachers' performance. By focusing on formal criteria, the data does not give much feedback either to teachers, schools or parents on what spheres they need further development (Männamaa, 2005).

Taking into consideration the national practices of teachers' accreditation process and Estonian practice, we propose that the procedure would be more efficient, if it would follow life-long learning aspects, be more performance-based, and technologically supported.

2.1 Theoretical Model for Portfolio-based Accreditation

Nonaka and Takeuchi (1995) have developed the cyclical knowledge management model, which contains four phases of knowledge conversion within an organization: socialization, externalization, combination and internalization (SECI phases). They described the SECI phases on the basis of Japanese industrial organizations for

enhancing knowledge management. Some authors have criticized the SECI model (Gourlay, 2003; Poell & van der Krogt, 2003), mainly by focusing on the validation issues of the model. However, we argue that the SECI model could be used for supporting learning and knowledge building (LKB) in the context of teachers' accreditation. For example, Naeve, et al. (2008) have used SECI phases for describing learning process at workplace, focusing on reflective practices in networking and collaboration. In this paper, based on original SECI phases, we propose the LKB model for extended organizations, developed by the IntelLEO project (www.intelleo.eu), which also considers the self-directed planning and reflection for competence development in organizational context. An Intelligent Learning Extended Organization framework, developed in IntelLEO project, represents a learning community that emerges as a temporal integration of two or more industrial, educational and/or research organizations with different cultures (Stokic et al., 2008; Kieslinger, et al., 2009). In teacher development context, Pata and Laanpere (2008) have mapped the teacher development activities using SECI phases:

Socialization - main aims of this phase are related to participating in social networks across various boundaries, talking about, sharing, shaping and taking ownership of institutional standards and community norms and visions. In this mode, different organizational objectives, norms and standards (National curriculum, teacher-competence standard, school documentation, pedagogical practice or accreditation requirements etc.) should be accessible for individuals from different organizations, and shareable between them in electronic format to understand the work situations.

Externalization happens as part of accreditation process when teachers are prompted to create and articulate tacit concepts through abductive reasoning, the use of metaphors for concept creation, and the use of models, diagrams or prototypes. For example, they could write down their plans and reflect about the activities, but they need to consider the organizational norms, and community expectations as guidelines in their reflections. This would make the individual tacit knowledge explicit, documented and reusable as knowledge objects, which can be shared with other persons (such as one's mentor from school, facilitators from university, accreditation authorities etc).

Combination activities are primarily group-based and can be supported by organizing community discussions, presentations and meetings. For

example preparing new versions of National Curriculum, teachers' qualification standards, or innovative teaching materials and methods.

Internalization phase is mainly an individual planning and learning process. Two aspects are important in internalization: a) it includes planning and reflecting on what competencies and goals teachers want to achieve, simultaneously harmonizing their plans with organizational visions, norms and expected competencies (e.g. nationally accepted professional competence scales, accepted learning theories, etc.); b) planning the professional development suggests learning from other professionals' experiences and combining it with academic knowledge.

Our study in the context of the IntelLEO project focuses on implementing the introduced LKB model in teacher development process – in pre-service studies, induction year program and in-service teacher training. In this paper, we narrow it down and explore only the accreditation process in teachers' profession. Therefore, as the current accreditation process is focusing only on individual level, not all the aspects of the cross-organizational LKB model are essential. The most important components of the proposed LKB model in accreditation context are internalization and externalization phases. In this process, teacher is mainly expected to plan and reflect about the professional competence development. Teacher should document the development throughout his everyday working practice in order to turn the implicit knowledge to explicit.

Initially Nonaka and Takeuchi (1995) did not assume that SECI phases should be processed using the technology. However, modern society presumes more or less that teacher uses some technology for professional development and life-long learning (European Commission, 2007). Many studies have demonstrated the advantages of e-portfolio in supporting teachers' professional development (Zeichner & Wray, 2001; Helleve, 2009; Barrett, 2010). Barrett (2010) sees e-portfolio as an electronic collection of evidence that shows person's learning journey over time, and may relate to specific academic fields or to the lifelong learning. Barrett adds that evidence may include writing samples, photos, videos, research projects, observations by mentors and peers, and/or reflective thinking, and emphasizes the key aspect of an e-portfolio – the reflection on the evidence, such as why this piece of evidence was chosen and what one learned from the process of developing e-portfolio. In competence-based teacher assessment it

is common to use portfolios with selected evidence of performances and products in various contexts, accompanied by teacher's comments and reflections (Wolf & Dietz, 1998). Portfolio assessment can be used as the tool to ascertain whether teachers would satisfy the required competences, and to formulate guidelines for professional development. In the first case, summative assessment is used to account for the teacher's quality, with possible consequences such as merit pay and accreditation. In the second case, assessment has a formative goal, and produces information that can be used for planning activities directed at further professional development (van der Schaaf, 2005).

3 METHODOLOGY

3.1 Research Design

This study was conducted in the context of EU IST program project IntelLEO (2009 – 2012). Study was conducted in three phases – first we developed LKB model for teacher development based on theoretical considerations, derived from Nonaka and Takeuchi (1995) knowledge management model. In the next phase, interviews with the stakeholders were conducted, where the theoretical LKB model was discussed with them to validate the model. Also potential barriers were identified, but also current LKB activities were mapped in the accreditation context. From the feedback, given by the stakeholders, the potential scenario using cross-organizational LKB model with technological support in accreditation process was collaboratively developed and discussed with the stakeholders. Scenario will be empirically validated in the teachers' accreditation context in the next phase of IntelLEO project in 2011.

This study used participatory design approach for finding out how the accreditation process should be implemented with the portfolio-based learning environment. The aim of implementing the participatory design elements in the process of developing the technical solution is to bring the end-users closer to the development process, and to stress the importance of collaboration between users and developers (Muller, 2002). Participatory design assumes that workers themselves are in the best position to determine how to improve their work and their work life and, therefore, it turns the traditional designer-user relationship upside down, viewing the user as the expert and the designer as technical consultant (Schuler & Namioka, 1993). Participatory

design is the main approach for developing the framework for the pedagogical and technological solutions for this study (Kieslinger, et al., 2009).

The in-service teachers, representing Estonian Professional Teachers Association, were involved in the development process as stakeholders, co-designers, and domain experts. First, they were involved in mapping the state of the current accreditation process, and further, they discussed how it should be reorganized, including the consideration of the individual and organizational barriers. This activity was followed by the next interview, where in-service teachers and researchers collaboratively developed and designed an alternative scenario for accreditation process involving competency-based e-portfolio and the LKB model. Participatory design elements have also been used in the iterative, three-stage software development process in the IntelLEO project, resulting with paper prototypes, early prototypes and eventually, full prototypes.

3.2 Sample

For the study, three in-service teachers from Estonian Teachers' Association were interviewed. They were involved into mapping the current accreditation process, testing the paper-prototypes of services developed by the IntelLEO project, and designing the expected accreditation scenario in portfolio-based learning environment.

3.3 Data Collection and Analysis

For the study, we developed questions for an unstructured interview, and the LKB model schema that stakeholders edited during the interview process. Questions were focusing on: a) artifacts and documents to be presented to accreditation committee (how documents are managed at the moment, what activities are required from the point of view of teacher or organization), b) processes related with preparing and presenting the accreditation portfolio, c) the role of technology, d) stakeholders in the process of accreditation and e) barriers related with accreditation process.

Data were collected with focus group interviews. Each interview lasted about 1,5 hours and interviews were taped. Interviews were divided into three sections. Two iterations of interviews were conducted in the study. The first interview focused on validation of the theoretical LKB model in accreditation context. We got the feedback to the current LKB processes and about the barriers. The

next interview was conducted as the participatory design session, where the stakeholders evaluated and redesigned the scenario developed by the designers. Stakeholders analyzed how realistic the scenario would be, whether they could implement it in their accreditation process, what challenges they might meet from the individual aspect, and also from organizational aspect if following this scenario.

In order to analyze the data received from the first interview with stakeholders, a framework analysis method was used. Framework analysis, as described by Ritchie & Spencer (1994), is „an analytical process which involves a number of distinct though highly interconnected stages”. The five key stages outlined are: familiarization; identifying a thematic framework; indexing; charting; mapping and interpretation. In the context of this study, we conducted the following steps: After data collection, we got familiar with the recordings, and the taped information was typed. The next step was writing the memos in the margins of the text including questions, ideas, phrases, which lead us to developing the categories. We focused on two types of thematic context – the first was predefined by the SECI model phases, and other focused on themes related with the challenges that might be faced in implementing this LKB model in accreditation context. Categorization was based on SECI phases (“socialization”, “externalization”, “combination”, “internalization”) and was in turn divided into “current situation” and “expected situation”. In addition to those categories, there were included technological tools (“blog”, “forum”, “learning resources repositories”) and challenges related with implementation of the model (“facilitation”, “training”, “motivation”). In the next stage, quotes were highlighted and sorted. In the fourth stage, we lifted the quotes from the original context and re-arranged them in the newly developed appropriate thematic context.

4 RESULTS

First, we provide the description of the designed and developed initial technological environment, which may support accreditation process in teacher development process. Then we discuss the gaps and controversies of current in-service teacher accreditation process in Estonia from the perspective of teachers themselves. Finally, we present an alternative accreditation scenario developed together with teachers in which innovative IntelLEO services will be used.

4.1 Web Tools for Teachers

The main Web tools used in teacher development context in Estonia consists of two Web portals:

Koolielu.ee - an Elgg-based social software application, which is integrated with the central learning resource repository and portfolio system for teachers (Sillaots & Laanpere, 2009), and

LeMill.net - a collaborative authoring tool and repository of Web-based learning resources (Leinonen, et al., 2010).

Both, Koolielu and LeMill provide many features for scaffolding professional development of teachers: information management, community/group formation, but also creating, filtering, aggregating, finding, sharing and co-editing various types of digital artifacts (presentations, lesson plans, quizzes, interactive worksheets etc). The interoperability of Koolielu with LeMill and other social software tools enables a teacher to compose a personalized online environment for documenting the activities related with his/her professional development. For example, videos and images stored in Youtube and Flickr could be embedded into the learning materials that the teacher prepares in LeMill social repository and shares with her students. Further, these artifacts could be embedded as evidences of professional practice into teacher's personal portfolio in Koolielu, where reflections and annotations can be added to each object.

In addition to that, IntelLEO project has provided a set of new semantic Web services that are based on SECI model and can be integrated with the Koolielu portal. Below we describe two of the Intelleo core services (Learning Path Creator and Organizational Policy Tool), which are the most relevant for teachers in the context of accreditation.

Learning Path Creator (LPC) is a personal tool for planning and documenting personal learning paths, defined as sets of envisaged or completed learning activities together with related knowledge assets, events and competences. LPC provides users with three main functionalities:

1. Users can manage and plan for their learning goals (target competences). These learning goals either stem from within an organization a user belongs to, or originate from other parts of Extended Organization. In either of these cases, the LPC helps users to harmonize their learning goal with organizational objectives.
2. Based on the contextual data representing users' tasks, learning goals, competences and other relevant information, LPC recommends

appropriate learning paths for achieving a certain competence to users or helps them to create learning paths on their own.

3. It supports users in documenting and sharing their learning experiences about how they have achieved a certain competency via accomplishing a set of activities, using knowledge resources and communicating with their colleagues.

Organizational Policy Tool (OPT) service used to define needs and requirements at the organizational and administrative levels: specifying the organizational structure and job positions, binding job positions to a set of competence definitions, harmonizing the set of internal competences with the one of other organization (e.g. university), setting incentives for competence management etc.

The third Intelleo core service (User Monitoring) collects from Koolielu and LeMill the data on user's activities and artifacts, making it available for OPT and LPC. OPT service has feedback functionality, which allows the discovery of repeating activity patterns. If several teachers have defined certain personal competences frequently as their learning goals, the accreditation commission members might consider such personal goals to be relevant and/or necessary to be integrated into the professional standards of teachers. OPT enables to create and suggest officially recommended learning paths for supporting the accreditation process.

Learning Path Creator supports competence management process of individuals. However, each organization might have certain rules and policies in terms of sharing organizational knowledge. In order to address this issue, OPT assures that individuals' knowledge sharing process is compliant with the organization's culture, rules and norms. Combining LPC and OPT with the e-portfolio, which supports reflection on actions using blogging, uploading files as evidences of one's competences, creating learning materials, networking, collecting Web links, learning resources, might support the professional development and accreditation process efficiently.

4.2 Current Accreditation Process

The accreditation process to get novice teacher certification, or raise the rank from the initial teacher to the expert-teacher rank is currently not conducted electronically. These teachers who would like to get the expert-teacher rank, have to send the documentation about their competences electronically to an e-mail address of the

accreditation commission. The rest of the procedure includes the assessment of the following criteria and activities:

- The conformity of his/her qualification to the position applied for;
- Teacher's self-evaluation about the professional activities;
- Has acquired a scientific degree (master's degree usually) in the field of education;
- Has taken in-service teacher training (at least 160 hours of work) during the past five years;
- Has supervised pre-service teachers during their pedagogical practice or novice teachers;
- Has participated in the development work of an educational institution;
- Has compiled or reviewed pedagogical research papers;
- Has been a lecturer of in-service teacher training;
- Has organized contests, exhibitions of students;
- Has supervised students participating in contests and exhibitions;
- Has compiled or reviewed published teaching materials;
- Has performed in educational events, conferences or written articles on pedagogical issues in newspapers / journals;
- Has participated in or supervised the work of educational associations and workgroups;
- Has supervised youth organizations.
- The candidate has worked efficiently (school administrator's evaluation)

Teacher who starts the accreditation process has to fill in at least ten out of fourteen aspects and add the documentation and evidences for each aspect. After that, teacher has to forward this documentation to the accreditation commission who formulates the decision.

The interviewed teachers identified some of the barriers in the current procedure of the accreditation process:

Lack of Reflection. Teachers have merely to list all the evidences of passing the courses or about guiding the youth organizations, but they are not expected to reflect about their activities.

No Connection with the 'Standard of Teacher's Professional Competence'. Although teachers are expected to follow their qualification standard in their professional activities, none of the evaluation aspects involves the official comparison with the normative competence document. Even the passed training courses could be taken from any field of

subject, just as long as 160 hours of studies have been passed.

No Feedback. The commission will let the teacher to know if the next rank has been nominated, but no feedback is given if any of the aspects was performed especially well, and what should be improved in the future.

Do Not Support Life-long Learning. The accreditation portfolio will be presented to the commission either paper-based or just sent as the text-documents. It does not include reflections or innovative web-based learning materials as evidences of teacher's professional performance. Neither does it include plans for the next working period. In the future, when teacher would like to apply for the next rank, she/he has no systematic recordings what was presented to the commission during the last time of accreditation, or what new plans were made for the upcoming period etc.

Missing Performance-based Assessment. As the accreditation process assumes presenting the list of documents and paper-based evidences, teachers have few chances to present the evidence of their professional development using the digital learning resources composed by them, they can not show their belonging to the professional online communities, no weblog reflections could be presented as evidences etc.

According to this feedback, collected from teachers during participatory design sessions, it can be assumed that current accreditation process of teacher profession is too formal, bureaucratic and does not support teachers' intrinsically motivated LKB activities.

4.3 Expected Accreditation Scenario

This chapter provides a scenario for conducting accreditation for teacher's profession using e-portfolio and LPC and OPC services of the IntelLEO project. Thereby, we illustrate the applicability of the proposed LKB model. The scenario was developed in the participatory design sessions together with teachers who are also willing to test it empirically.

Jane has been working at school for 14 years. She has participated in and successfully finished several in-service training courses at the university, been an active member of different associations, and now she has decided to pass the accreditation process in order to get the next rank in her teacher career. Jane uses the portfolio-based environment for accreditation process. Using her portfolio's

learning path creator, she has access to the official competence template, where 14 required activities for accreditation are listed as a required learning path. (Note, this template was prepared using the organizational policy tool). From these pre-defined fourteen activities in the normative learning path, at least ten should be completed to get the next teacher rank. The activities may be ordered differently, however, Jane wants, to present her development like a storyboard. To provide evidence for each competence, Jane describes her learning activities and uploads files or adds a Web links as evidences of her competences. All described learning paths should be explained and self-evaluated with reflections. It is not possible to save the template when there is no comment or input behind each required activity. Even if the entry states that "I have not supervised students' scientific works because in my school..." the reflection of this activity should explain why this activity was not accomplished and still connected with competence that have been accomplished. In LPC all the activities in the learning path of the accreditation form have to be connected with one or many competencies from the competence standard accessed via OPT. Finally teacher should make plans about the professional development for the next professional period. After completing the accreditation process, portfolio-based learning environment will create the central page, where the storyboard with competences, activities and evidences can be easily accessed.

The created content may be visible only for the owner (teacher), only for selected users (accreditation commission members) or only for one community (school teachers, school board, etc.).

From the organizational point of view, The National Examinations and Qualifications Centre develops the formative evaluation learning path template using OPT tool. Additionally, the learning path activities will be associated with appropriate competences described in the V Standard of Teacher's Professional Competence, using the same tool. OPT has a feedback module, which enables to search and retrieve novel competence descriptions created by teachers with LPC. These emerging competences, identified by the teachers in work practice, could be integrated to the new versions of accreditation learning paths and teacher competence standards. This enables to dynamically update the teacher competence standards. The connection between OPC and LPC makes the template visible for the teacher who starts portfolio-based accreditation process. After the teacher has

completed the accreditation process and provided the commission with the access to the portfolio, the commission is expected to give feedback to the each of the competence-based activity in the portfolio. They must write a reflective evaluation and give suggestions for the future. Other users (teachers, school board) can provide feedback via comments as well. The teacher will save the commented accreditation in portfolio, and use the filled in competence-based learning paths for identifying her/his gaps and planning her/his future development. This portfolio profile of competences may also be used in the future planning process, when the teacher has to go through the accreditation process again.

During the design sessions the participants identified also some challenges related of applying the described scenario in school context:

Resistance of School Board. Schools might have objections related with public portfolios, which also contains information about school as an organization (projects, development, issues that influence teacher's participation in training courses). In order to diminish the resistance, the public portfolios (specially accreditation of learning paths) could be presented in impersonal voice, especially the personal details. The portfolios should remain public to some extent, becoming useful as learning materials and examples for the other teachers, pre-service teachers or university teachers. The owner of the portfolio should have the right to decide, which parts of his/her portfolio should be shared and with whom (e.g. mentor, supervisor, closest colleagues).

Inclusion of Policymakers. Teachers may be ready to start using portfolios in their professional development activities (including accreditation, training courses, induction year, supervising etc). If none of the organizations responsible for these activities use portfolios as part of their LKB processes, the teachers' motivation to follow the portfolio-based competence-planning and reflection procedures might be low. Inclusion of the policymakers to making innovative changes in the LKB processes, and using new technology services to support LKB is rather difficult. The need for innovative changes may be highlighted by referring to the official statements that current situation is not sufficient, also by attracting representatives of the involved organizations with training sessions for using innovative LKB in their professional learning activities.

Honesty of Teachers' Reflections. On one hand, interviewees asked, would the teacher be honest

towards the employer? Can one admit in the reflection that she has not passed 160 hours of training courses because of the school board who does not support taking the course during the working time. On the other hand, does teacher dare to be honest to herself in the reflections and admit that she has not passed 160 hours of training courses because of being lazy. The interviewees pointed out that the honesty of public reflections can be an issue in every field of activities of teacher development (documenting the school practice during initial teacher education, supervised teaching during induction year etc). Therefore, advancement of critical self-analysis skills is important part of our LKB model.

Described scenario is an example how to use developed LKB model in the accreditation process in teacher development context. Also this scenario illustrates how e-portfolio, combined with Intelleo services, which provide support for personal learning (LPC) and organizational policy aspects (OPT), can scaffold the implementation of the LKB model.

5 CONCLUSIONS

This study illustrated that the current teachers' accreditation process in Estonia is too formal and bureaucratic and does not support teachers' intrinsically motivated performance-based assessment and lifelong learning. Using participatory design as the research method together with teachers, we mapped the current accreditation process and the barriers, and developed the application scenario for the expected situation in the field of accreditation. Addition to that, the functionalities of the additional services (Learning Path Creator and Organizational Policy Tool) for the portfolio-based learning environment were designed as paper-based prototypes and evaluated.

Participant satisfaction among teachers from Estonian Teachers' Association demonstrated that the implementation of the developed LKB model and illustrative scenario about teachers' accreditation process could be efficient. But the process should involve addition to teachers also school boards and policymakers (e.g. National Examinations and Qualifications Centre), which is the main challenge of this study. Still, the next stage of the research will focus on implementation of the developed scenario, as the teachers' willingness to participate in further evaluation, was high.

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