E-portfolio for professional learning community

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Abstract: - The e-portfolio in education and professional development assists the work that a learner has designed, documented and presented individually or in collaboration. Reflection process in the portfolio-assisted learning fosters the development of generic and transferable knowledge and skills that a learner needs in knowledge economy. This article focuses on professional learning, using the e-portfolio in a web-based learning community. The open source e-portfolio system is presented, and e-portfolio functionalities in continuous professional development: functions, influencing factors and modes of use are outlined. Sociocultural constructivism provides the theoretical framework when analysing e-portfolio support system for professional development within the web-based professional learning community. Web-based communities foster the interplay of intentional and non-intentional learning, embedded in day-to-day workplace practices. The study of adopting e-portfolio as a tool in professional learning with special emphasis on its efficiency in collaborative learning and sustaining participation in a professional learning community is presented.

Key-Words: - E-portfolio, Learning management system, Open source, Constructivism, Professional development, Community of practice, Learning community

1 Introduction

Sociocultural constructivism is placing professional learning in workplace environment. Acknowledging sociocultural context, learning is understood as a change arising from participation in social practices [18, 24, 25, 31]. Sociocultural research focuses on social activities in learning processes and learning environments within wider societal and cultural settings. Psychological perspectives focusing on an individual as a unit of analysis, investigate the learner's individual cognitive processes.

Working life environments are explored as an individual and social context for professional learning. Improvement of professional development activities and resources, aiming at quality learning research, is increasingly focusing on:

- web-based communities for learning and communities of practice,
- e-portfolio as a learning tool for assisting reflection in authentic collaboration [15].

Communities of practice for connecting intentional and non-intentional learning embedded in the day-to-day practice foster knowledge generation, exchange and sharing. The non-formal learning characteristics of the communities of practice contribute to the implementation of communities in diverse contexts of workplace learning, preserving the authenticity of those environments in learning.

The establishment of communities of practice and communities of learning enhances the capacity of individual as well as organisational growth and development.

2 E-portfolio

Portfolio is a tool that enables the arranging, organising, and ensuring the transparency of continuity of processes and achievements emerging in such processes. Portfolio as a tool successfully realises its potentials in the electronic form. Portfolio functions, as development, evaluation and presentation, are in the e-portfolio based on different principles, which are linked in particular to the characteristics of information-communication technology.

They may be described as interactivity, reusability and multimodality. E-portfolio not only renders learning processes transparent but also reaches into such processes by establishing interaction between the e-portfolio designer(s) and "reader(s)". This is facilitated through a reflexive relationship between the e-portfolio designer(s) and the material under treatment which in one way or another incorporates also the "reader(s)" or other participants in the process.

An e-portfolio is nowadays expected to stimulate an extensive accessibility and realisation of authentic activities, openness, cooperativeness, and collective achievements, which are the product of

critical and reflexive work of individuals and groups. A portfolio is designed by a learner himself, or it may be set up as an organisational portfolio.

Portfolio for learning has the function of knowledge valuation, achievement presentation, and developmental function [20]. It is of key importance that a portfolio is designed in a developmental perspective and that it enables authentic activities, which makes its role in the education process and professional development all the more important.

A portfolio may show the progress made by a learner, it may present the learner's best products, support the particular teaching methods in the learning process, as for instance, problem learning, project work, action research, or it may be established as a knowledge examination and assessment method (at a diagnostic, formative, or summative level).

As portfolio was being introduced into education, its role in authentic assessment was emphasised in particular as it facilitated the monitoring of gradual development and learning [7]. More recently, the possibilities which portfolio offers in overcoming the gaps between theory and practice have been given priority [13]. Portfolio for demonstrating the informally acquired knowledge and experience, called also the experiential portfolio, has already been well established.

The use of portfolio in support of professional development at organisational level has been more and more extensive as well [34]. This article deals with the portfolio in a community for professional learning. The role of e-portfolio in work-based learning focuses on the continuous reflection of workplace activities and professional learning in authentic working environments. In designing the portfolio, the learner reflects, investigates and evaluates his own work, learning processes and his own knowledge. Work with portfolio stimulates the skills of directing one's own learning and the more autonomous handling. Impacts on the development of generic and transferable skills are significant.

3 E-portfolio functionalities in continuous professional development

3.1 Background

Forming teacher's professional identity is a process which starts in initial education and pre-service training and continuous after entering working life with continuous learning and in-service training. In one own's professional development

teacher goes through professional or career stages. Teacher in goes in one own's professional development according to Berliner [1, 36, 37] through 4 phases. In the first phase the novoice teacher is focused on development of teaching competences. In the second phase experienced teacher already acquire necessary teaching experiences. Te third phase of successful teacher can be accomplished after four or five years of teaching experiences. The last phase of expert can not be accomplished by all teachers.

Some authors focus on the problem arising in the phases of professional development. Accordingly Huberman's developed five-stage model [14]: exploration and stabilisation, commitment, diversification, serenity or distancing, conservativism.

Professional knowledge can be in a simplified way defined as content knowledge, general pedagogical knowledge, contextual knowledge [11, 23]. A gap between theory and practice is acknowledged. Argyris in Schon made a distinction between the espoused theories and theories in use, and emphasize the influence on professional knowledge by the practical work [1]. Teacher's professional identity is shaping constantly in teacher's professional practice distributed and shared as: identity as negotiated experiences, identity as community membership, identity as learning trajectory, identity as nexus of multimembership and identity as a relation between local and global [26]. In shaping teacher as professional the role of professional community is emphasized [3]. Developing a practice requires the formation of a community where members engage in mutual activities sharing their understanding and knowledge.

Professional growth is grounded in individual's reflective powers which are formed within continuous practices and processes of creating its identity, autonomy, and reflectivity. Contemporary models of teacher's professional development assist professional development and learning sustained and continuous within teacher's authentic working and life environments. Short term and episodic events and workshops which are decontextualised from teacher's core practice are facing knowledge transfer obstacles. Professional learning takes place within socially organised activities when individual teacher participates in authentic activities of pedagogical practice which are work and teamwork based. Grassa et all. Report on impact of team work on motivation [10].

Presently are in focus approaches to professional development that assist team work:

- research based professional development with action research as most widely used,
- mentoring as a form of professional development and
- communities applied as communities of practice and learning communities.

These approaches are aligned with systemic changes which are apparent in European and global initial teacher education and lifelong learning and are influencing new strategies and approaches to teacher's professional development. The main principles are addressed in order to fulfill requirements and conditions for novel models of teacher professional development.

Among research based professional development action research is widely used [6]. Action research is conducted by teams of teachers and pedagogical workers aiming at improvements in teaching and learning within concrete pedagogical practice. Main characteristics of action research are that is team based and oriented towards action therefore can influence teachers' believes, attitudes and wider the organisational culture. Carr and Kemmis [4] have described action research process as "spiral of cycles". The continuous spiral of action with reflection and evaluation is taking place on the basis of problem identification and planning assisting change process.

Mentorship has assumed respectability in professional education starting in teaching practice, in the licensing for teacher's profession and certification processes. In continuous professional development mentorship can serve in many formal and informal ways. Mentoring process develops gradually starting in initiation phase of mentor and mentee relationship. The process takes time and is not successful when the mentorship duration is short [16]. Daloz had described main functions of mentor as support, challenge and vision [8]. Main mentor's activity is to help mentee to learn and reflect on professional learning.

Communities applied as communities of practice and learning communities produce creative environments in which professional knowledge can be developed. In recent professional development programs they are in central focus [3].

The potentials of technology based human development resources in professional development and training are being recognized and accepted in educational sector. Design and introduction of online professional support systems are fostering a systematic change in working habits, processes and structures of pedagogical workers.

The various forms are being introduced: training databases, training courses, remote learning platforms, tools for professional planning and evaluation, tools for competence descriptions and assessment. Ubiquitous learning approaches are fostered to match individual learning needs with learning resources and collaborators. Contemporary Web 2.0 services offer applications emphasizing online collaboration social networking and social learning. The systems foster accessibility, creation and sharing with increased productivity, creativity in collaboration.

Professional development is depending on a number of principles, including that it needs to be sustained over time. Many factors at system, organizational and individual levels are influencing sustainability. The online communities are offering a creative setting where pedagogical workers can share and develop their professional knowledge. Web 2.0 services address these complex needs enabling community-wide annotation and collaboration.

3.2 E-portfolio

Traditional portfolio has limited options of flexibility, collegial and group work, which significantly contribute to the success of an individual at learning and development. The role of learning context, societal and cultural environment in an individual's learning was emphasized by theoreticians of the sociocultural constructivism.

Learning is an activity taking place in a social and cultural environment, closely linked to social processes [24]. Basis of the leading themes, including situated cognition, social cognitive tools, coordination of cognition with linguistic tools, was created by Vygotski [30]. Vygotski pointed out the role of language and of other sociocultural cultural symbol systems in an individual's development and learning, and the role of social interaction in a child's development. Social and cultural constructivism impacted the use of a computer in learning, which is based more and more on teamwork.

Computer as cultural tool impacts the sociocultural representation and signifying practices which design the cognition processes and learning processes. Computer redesigns the nature and organisation of learning environment and enables the setting up of new learning environments and communities.

E-portfolio opens up opportunities for learning in groups, and for setting up communities. At selecting, designing, reflecting, planning,

publishing, it enables also the cooperation, teamwork, and setting up communities. As pointed out by Barrett, e-portfolio is a tool for presenting development rather than a collection of multimedia materials [2]. E-portfolio has been used to demonstrate learner's progress over time. Recent e-portfolio has been implemented in learning progress as constitutional part of learning.

Cooperation between the e-portfolio designer(s) and the community(ies) takes place in several ways. E-portfolio enables the transparency of process continuity (e.g. learning, personal professional development, quality assurance) and of results. Specific ICT and e-portfolio characteristics, which enable the authenticity of activities in portfolio designing, are an automation of the processes of collecting, documenting and publishing materials, of reusability, interoperability, interactivity and multimodality.

The process of collecting, documenting and publishing materials in e-portfolio is automated for the designer and for persons reviewing the materials or otherwise involved in the designing process alike. The same e-portfolio is adapted for the needs of different users and is reusable, providing thereby for the interoperability at two levels: data flow from the central system to personal portfolios, and connectivity of personal portfolio to the different systems.

E-portfolio is interlinked to external electronic sources and ensures multidirectional interaction. ICT-supported contemporary communication practices in education are multimodal (combine the different modes of presentation, as for instance, the text, video recordings, speech, sound effects or music) and introduce multilayer effects into the sphere of teaching and learning [17].

Figure 1: E-portfolio functionalities in professional development

Ensuring long-term developmental perspective of an individual and of institutions is a fundamental goal of the contemporary educational systems and continuous lifelong learning of teachers. Contemporary information-communication technology ensures the realisation of supporting systems which are set up in the working environments, incorporated in the local and greater environments, combining the formal and informal learning, and supporting the activities of professional communities. It enables the realisation of all the models and their combinations in managing and administration of supporting systems.

Among the more and more established forms is the e-portfolio, which has the functions of valuation, presentation and development in the educational process and professional development of a teacher.

The functions of valuation and development are most important. E-portfolio is used for valuation in the preliminary education of teachers, in preparing them for employment, and at all the stages of professional development of teachers. Reflection process leads an individual in developing his own professionalism. By stimulating reflection, investigation and valuation of one's own work, portfolio impacts the quality of a teacher's work, and consequently, the learning and learning achievements of students.

Process orientation of e-portfolio, jointly with the possibilities of cooperation and teamwork, ensure the authenticity of e-portfolio activities. The teacher establishes his professional knowledge in the process of cooperation in the professional communities, where he forms his conceptions, approaches to teaching within the context of community, which is vital for the development of his professional identity [12, 32].

Professional communities in web-based environments are becoming more and more extensive, and e-portfolio is one of the key tools enabling the more authentic valuation of a teacher's professional growth [35]. A teacher's professional growth includes processes, and among them, the autonomy, integrity, identity, cooperation, and incorporation, and creating common knowledge. Perceiving, monitoring and supporting such processes is most demanding for an individual, as well as for institutions.

E-portfolio has contributed much in the very sense of insight into these processes. Characteristics of working with a portfolio, ensuing from the ICT characteristics, offer an insight into processes by
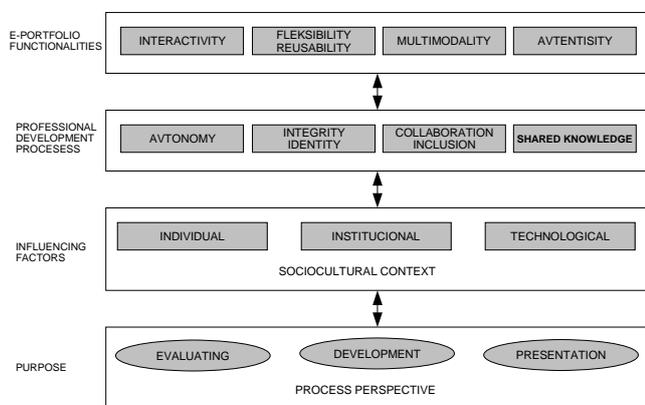
stages. Regular record-keeping and documenting in the portfolio ensures a testimony through a longer period of time. Factors impacting the portfolio designing process, part of the sociocultural processes, may be described at individual, institutional and technological levels (Figure 1).

4 Developing an effective e-portfolio support system for professional learning

Teachers and pedagogical workers, altogether over 100 persons, were supervised in e-portfolio development in a more than 1-year period of time. E-portfolio assisted the work of institutional teams and the collaboration of institutional teams (24 teams) at institutional level and in a web-based community. E-portfolio development was assisted by collaborative work at institutional and web-based community level.

Learning management system was selected as environment for professional community. The choice was made for open source learning management system, suitable for modification. Moodle learning management system [21] was selected on account of its extensive usability [5, 27, 33]. Moodle is in Slovenia used in teacher training courses and in educational organizations on all levels from preschool to university level.

For the purposes of the project we developed a new e-portfolio system for Moodle in order to provide learnability, effectiveness, efficiency and satisfaction of learning management system [22]. The reason was that the participating teachers and pedagogical workers did not all have the well developed competences and skills for work with computer, and only few of them had used learning management systems before. At the time of implementation of the project, Moodle had a very complex system for e-portfolio which was not easy to use.

E-portfolio was designed to assist the professional web-based learning community in individual and collaborative work at institutional and inter-institutional level. The e-portfolio structure was very simple for users to add new elements. At institutional level, teams had workplace in the "mentor teams" area. Two large communities were established at web-based community level: one for mentors, and one for mentees.

In Moodle, all the communities had a similar workplace environment (Figure 2): resources

(learning and professional development resources), administration support through e-mail and forum, forums for peer and group discussions during portfolio creation, and counselling area, where expert supervisors guided and assisted learners in portfolio creation. A coffee room was available for private discussions of learners.
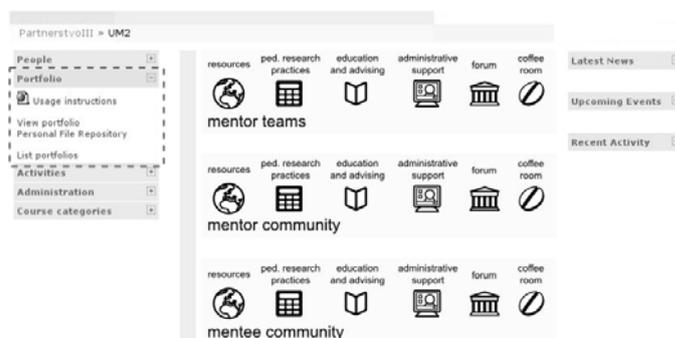

Figure 2: E-portfolio assisted professional communities

Instructions for e-portfolio were designed according to the learning and collaborative activities. Pre-prepared forms for all the activities were designed, and learners could upload them into their computers. Learners completed the forms as they were requested to do, and then included them in their personal e-portfolios. At the beginning of the project, users accessed personal e-portfolios through personal profiles, where we added a new portfolio tab object after the forum posts tab object (Figure 3). This decision was made in order to introduce e-portfolio at the first meeting, when users designed their personal profiles. Almost all the users were using e-portfolio and Moodle for the first time.

Figure 3: E-portfolio tab object in personal profile

During the project, when users were becoming more confident in e-portfolio use, we designed in Moodle a new "portfolio block", where users could access their portfolios (View portfolio, Personal file repository) and e-portfolio instructions. Instructions provided information concerning the creation of portfolio, including content selection and design with portfolio elements creation. Pre-prepared elements were accessible through links in instructions. For experts leading portfolio process

we added the listing through portfolio elements (Figure 6).

In the portfolio block we added a function for listing all the portfolios, for a more effective work of the supervisors, which assisted the portfolio development process (Figure 4).
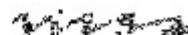

Figure 4: E-portfolio block

E-portfolio structure was the basis for quality improvement of pedagogical work according to the ISSA standards [28, 29]. All the portfolio elements were intended for publication, and the first portfolio element, Author vision statement, was in common agreement published all the time. Portfolio design process was aligned to timeline and guided by expert supervisors.

Figure 5: E-portfolio structure

Portfolio consisted of pre-prepared user elements. All the elements had a pre-prepared form (Author vision statement, Self-evaluation, Quality improvement plan, Observation and reflection, Professional development plan, Process documentation: Observation forms, Observation minutes, Plan), which the users could access through E-portfolio instructions. Documents assisted the reflection processes from the

professional planning process design of vision, self-evaluation, planning improvement through process of professional development, and improvement with continuous self-evaluation. Expert supervisors were giving feedback and assistance in e-portfolio through the process of professional planning and professional development.

Users downloaded these elements into their personal computers so as to enable their work. When the elements were ready for work, they uploaded them to e-portfolio.

Figure 6: Listing users' portfolios

5 Research design

The study was conducted among the pedagogical workers creating their portfolio participating in a web-based professional community from June 2006 to October 2007. Data collection was based on a numerical assessment scale and open questions in questionnaires at the end of the project in October 2007. At the same time, group interviews were conducted. In the study there participated 145 pedagogical workers from 24 educational institutions (elementary schools and nursery schools) from all the Slovenian regions.

Demographic structure of persons by sex was 8 males (5.5 %) and 137 females (94.5 %). Age

structure was as follows: up to 29 were 12 (8,3%), between 30-39 were 32 (22,1), 40-49 were 73 (50,3%), and 50 and over were 27 (18,6%) persons; one person did not complete this question. Number and percentage of participants by level of education was as follows: vocational secondary education had 26 persons (18,8%), general and technical secondary education had 19 (13,8%), upper secondary education had 40 (29%), university education had 52 (37,7%), and postgraduate level (specialization, Master's level) had 1 person (0,7%). Seven persons did not complete this question.

We assessed the influence of web-based community participation on the development of generic competences, which were selected according to Tuning project [9], and modified. Special focus was on e-portfolio in professional community as a tool for professional learning, with special emphasis on collaboration processes in professional development. Research questions focused on the investigation of:

- e-portfolio as a tool for professional learning, and on the work-based learning in particular;
- e-portfolio use to make collaborative learning more efficient;
- e-portfolio impacts in sustaining participation in a professional learning community.

6 Results and discussion

The aim of the survey was to establish, how pedagogical workers assess the use of e-portfolio in a web-based professional learning community so as to develop their personal competences. Their assessments were based on a scale from 1 (no impact) to 5 (great impact). Their classification of competences with regard to impacts of e-portfolio in a web-based community is shown in Table 1, presenting the mean and standard deviation for competences.

Based on results of the study, which was to assess the impact of web-based community participation on competences, we established that e-portfolio in a web-based community as a tool for professional learning had the following impacts on professional learning: applying knowledge to practice (3,38), capacity to learn (3,05), capacity to adapt to new situations (3,29), reflection and improvement (3,19), and problem solving (3,13). The use of e-portfolio in professional learning communities fosters participation in web-based communities [13], which constitute an important

source for knowledge development, exchange and sharing. Using e-portfolio to make collaborative learning more efficient, and assessing e-portfolio impacts on sustaining participation in professional learning community, we investigated the means of relevant competences (teamwork, participating in communities). The competences with the lowest means were: participating in communities (2,99), and teamwork (2,53).

A number of issues emerged from qualitative data at the individual, team, institutional and community levels. Pedagogical workers declared that the use of e-portfolio benefited them personally, and the teams. It was evident from questions and interview responses that e-portfolio managed professional development in a web-based community could provide great flexibility at introduction of ICT-assisted learning community to their employment context and work-based learning. Impact on the development of group identity, sense of common responsibility and responsibility for the learning of colleagues was clearly evident. However, it was established that individual factors and activities were better supported and accomplished. Conditions for collaborative learning in a community were affected by obstacles.

Table 1: Mean of the impact web-based community participation through e-portfolio on competences

Competences	Mean	St. deviation
information management	3,62	1,17
digital literacy	3,50	1,22
applying knowledge in practice	3,38	1,27
concern for quality	3,30	1,26
capacity to adopt to new situations	3,29	1,17
communication	3,29	1,28
reflection and improvement	3,19	1,28
problem solving	3,13	1,27
project design and management	3,12	1,37
research skills	3,05	1,31
understanding institutional context	3,04	1,36
capacity to learn	3,04	1,23
generating new ideas	3,03	1,33
ability to work autonomously	3,03	1,37
creative thinking	3,03	1,28
participating in a communities	2,99	1,29
organisation and leadership	2,93	1,35
interpersonal skills	2,70	1,35
understanding of multiculturality	2,64	1,37
teamwork	2,53	1,29
counselling	2,40	1,26
work in an interdisciplinary team	2,26	1,21
mentoring	2,26	1,20

Obstacles were investigated from the open questions from the questionnaire at the end of the project and

from group interviews. Pedagogical workers assessed the obstacles within sociocultural context at the individual, institutional and technological levels.

E-portfolio was used for three functions from the figure: evaluation, development and presentation assisting all presented processes in professional development with a focus on collaboration and construction of shared knowledge.

It was acknowledged at the institutional level that work-organisation does not foster the organised and spontaneous work-based professional learning, based on collaborative learning. There is not enough time reserved for collaborative professional development activities on a regular basis. From the technological point of view it was realized that ICT infrastructure present in workplaces was insufficient either to support ICT-assisted professional development individually or in teams. Individual factors were well supported within the project with the development of generic competences, digital competences, of capacity to learn, reflect, solve problems, and apply knowledge in practice.

As anticipated, e-portfolio design fostered development of generic competences and the use of ICT in general, and participation in the project had an overall institutional impact.

Notwithstanding the obstacles encountered during the project, the importance of e-portfolio was recognized by the institutions, and one third of participating institutions implemented e-portfolio for professional development at institutional level.

7 Conclusion

Promoting professional development and growth through creative activities in everyday workplace contexts enhances professional subjectivities oriented to continuous lifelong learning. Organisations are in a position to provide for their employees the environment and tools facilitating work-based professional learning, which combines the formal and non-formal learning of individuals and teams.

The potentials of ICT based human development resources in lifelong learning are being recognized and accepted in educational sector. Among the various forms which are being implemented the focus is on tools for professional planning and evaluation, tools for competence descriptions and assessment and ubiquitous learning approaches which foster matching individual learning needs with learning resources and collaborators. Contemporary Web 2.0 services offer applications

emphasizing online collaboration social networking and social learning. These systems foster accessibility, creation and sharing with increased productivity, creativity in collaboration.

E-portfolio is wide recognized tool for learning and has been used in the past to demonstrate learner's progress over time. Recent changes in e-portfolio use are oriented towards implementation of e-portfolio in learning progress as constitutional part of learning.

According to sociocultural constructivism framework which emphasize the importance of professional development activities in authentic life and workplace environments, the implementation of e-portfolio in professional learning community assist collaborative processes in team work based professional development. Based on empirical evidence and results of this study, e-portfolio collaborative systems can be implemented in professional learning communities, leading to substantial improvements in professional learning and development.

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