Fostering the Integration of Web 2.0 Technologies and E-learning in Vocational Education and Training

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Abstract: The European Commission placed e-learning on the top of its political agenda, calling for education and training systems to be adapted to meet this challenge. E-learning and Web 2.0 technologies contribute education and training to meet this aim by fostering the integration of ICT in educational process as a lever for change and as an opportunity for increasing quality, convenience, diversity and effectiveness of education. The paper describes one of the possible approaches to the development of Vocational Educational and Training (VET) EduCenter (www.educenter.eu) focussing on the presentation of five main elements of the centre (e-learning solutions, e-learning environment, communications, content repository and other tools) and the proposed methodology of e-learning, education and training for teachers of general and vocational subject in VET schools. Special attention is paid to the project »e[4] VET«, which presents an integral part of the Leonardo da Vinci – Transfer of Innovation – Lifelong Learning Programme aimed at supporting the role of innovation process in improving the quality in Vocational education and training systems.

Key-Words: - e-learning, e-learning environment, Vocational Education and Training (VET), EduCenter, e-course, Content Creator

1 Introduction

The project titled *»Enhancing, Empowering and Emphasizing E-learning in Vocational Education and Training«* or in short »e[4] VET« (www.e4vet.eu) was launched within the call for proposals of the Leonardo da Vinci – Transfer of Innovation – Lifelong Learning Programme in the spring of 2008.

The findings of several previous projects and national research studies [1, 16] have pointed out that in spite of substantial investment in computers and connectivity of Vocational Education and Training (VET), the **skills and motivation of teachers in VET to apply information and communication technologies (ICT) and Web 2.0 tools in their daily teaching activities are still inadequate** and under expectations. Besides the lack of competences of teachers and the shortage of e-learning materials, technological barriers such as high costs of infrastructure are additionally influencing the **provision and quality of e-learning materials**.

It is widely recognised that Free and Open Source Software (FOSS) can efficiently address many of these issues, and provide higher quality, reduced costs and increased availability of different platforms and other educational applications available. At present the e-learning materials are largely produced in-house, or are

purchased from commercial providers. Both options mentioned are expensive, and dramatically reduce the benefits gained from the use of FOSS educational software. In VET, there exists a particularly urgent need for progress in this direction.

E-learning has the potential to change VET radically, to open new ways of teaching and to increase the ability of teachers to acquire new ICT skills (as one of the 8 key competences). Web 2.0 technologies emerging trends and technologies are transforming the whole field of e-learning into one known as »e-learning 2.0«. In this new generation of e-learning, the learning process has become a social and collaborative activity.

With this in view, e-learning was assigned a key role in the pursuit of the EU's policy objective, announced at the Lisbon Summit in March 2000, of making the EU »the most competitive and dynamic knowledge-driven economy in the world« [2]. The e-learning initiative was launched by the European Commission two months later in order to encourage its spread and ensuring that "all education and training institutions have access to the Internet and multimedia resources by the end of 2001 and that all the teachers and trainers concerned are skilled adequately in the use of these technologies in order to provide all pupils with a broad digital literacy" [3].

The call of Leonardo da Vinci – Transfer of Innovation – Lifelong Learning Programme was addressing and tacking all these issues and was especially encouraging projects which would establish portals, tools and creates e-learning material for the improvement of training quality and methodologies in VET. In this context the »e^4 VET« project falls within Priority 6 of the Leonardo programme: developing the learning environment and Objective 2, to support improvements in quality and innovation in Vocational education and training systems, institutions and practices.

As the concrete response to the deficiencies identified above, the general aim of the »e^4 VET« project is **the promotion of the attractiveness of VET schools** by **establishing an EduCenter (Community Portal) by connecting different open source educational systems and Web 2.0 tools**. The project offers teachers of general and vocational subjects in VET, mentors of practical training in schools and enterprises, and teachers specializing in adult education and training both innovative and easy-to-use tools for developing e-learning materials, collaboration and interaction as well as access to a broad variety of e-learning materials.

»e^{4}VET« project **will improve the ability of teachers in VET** to make pedagogical use of ICT, through the establishment of an EduCenter providing e-learning materials developing tool and guidelines and resources for teachers. New contents of teachers'

training are expected to have a **significant impact on the quality and efficiency of VET.**

The »e^{4}VET« partnership structure comprises: **high technology e-learning infrastructure** (Jožef Stefan Institute, Slovenia, WiedzaNet, Poland, Nevron, Slovenia and University of Maribor, Slovenia), **didactics and evaluation in e-learning** (University of Leeds, England), the **network of recipients of innovations** (National Institute for Vocational Education and Training, Slovenia), and **pilot implementation and valorisation** of project outcomes (Secondary School of Trade and Commerce and Technical School Centre Nova Gorica, both Slovenia).

Fig. 1: The »e^{4}VET« partnership structure

In the next chapter we explore briefly the potential of Web 2.0 technologies and social software tools in building learning environments and portals by presenting first the functionality that could be used for this purpose. Besides, we explore the current attitudes of educators and instructors regarding the use or promotion of these tools in the process of professional learning. In the continuation special attention is given to the description of approaches used − the e-learning environment development and content creator (authoring tool) are presented as well as the current experiences. The paper ends with a short overview of the findings.

2 E-learning and Web 2.0 Technologies for e-learning

E-learning is a term, introduced along with the introduction of information and communication technology for educational purposes. Definitions of e-learning are various, diverse and lack unity, consequently, it is of outmost importance to provide a precise definitions of e-learning and the related notions. Hereby we are referring to the e-learning means the process of studying and teaching where it includes information and communication technology, regardless of the mode or the scope of its use [10, 11, 14].

Kirschner and Paas defined e-learning as a learning process in which internet plays the key role in the presentation, support, management and assessment of learning [12]. Rosenberg defines e-learning as a learning process in which information technology partially or fully undertakes the role of a mediator between different stakeholders involved in the learning process [13].

When we are talking about e-learning today we cannot overlook the impact which Web 2.0 technologies bring to the process of e-learning. Web 2.0 technologies are changing the way messages spread across the Web. A number of online tools and platforms are now defining how people share their perspectives, opinions, thoughts and experiences. Web 2.0 tools such as instant messaging systems, blogs, RSS, video casting, social bookmarking, social networking, podcasts and picture sharing sites are becoming more and more popular. One major advantage of Web 2.0 tools is that the majority of them are free. There is a large number of Web 2.0 tools, some of the more popular ones are: Instant messaging systems, Blogs, Video-Wiki and Xo-Wiki, Doodle, Podcasting, RSS.

The term Web 2.0 was coined by O'Reilly [7] as a common denominator for recent trends heading towards the 'Read-Write Web', allowing everyone to publish resources on the web using simple and open, personal and collaborative publishing tools, known as social software: blogs, wikis, social bookmarking systems, podcasts etc. The main features of these tools are dynamism, openness and free availability. According to MacManus and Porter [8], the power of social software lies in content personalization and remixing with other data to create much more useful information and knowledge. The continuously growing dissemination of social and open software in e-learning is expected to reshape those e-learning landscapes that are currently based on closed, proprietary, institutionalized systems. Thanks to the evolution of the web, the use of social and open software for learning is becoming an increasingly feasible alternative to these closed, proprietary, institutionalized systems.

2.1 Instant Messaging Systems (IMS)

The need for communication tools in the learning process is often underestimated by educators, especially those who feel comfortable with the traditional, instructive way of teaching [18]. However, even with their 'traditional' approach learners need to communicate with each other when working together. At the beginning of the 90s, digital communication tools were rather limited: apart from direct face-to-face meetings, the main way to communicate was using the plain old telephone. Sharing course materials was possible only by using a copier or a fax machine.

However, these devices were quite rare in ordinary households. The only barriers to communication that exist today are the lack of skills needed to operate new technologies. This barrier is not even noticed by most younger people, who have grown up as digital 'natives', rarely pulling themselves away from their computers (even in the street they have mobile phones in their pockets), but it definitely still is a serious obstacle for many educators. However, the new technologies are inevitably filtering down into the daily practice and in 2009, it is probably not necessary to explain what the purpose of instant messaging is. The top 10 instant messaging systems number of users in the world according to statistics from Wikipedia [17] is counted in hundreds of millions of users e.g. QQ 783 million total, 317.9 million active 40.3 million peak online (mostly in China), MSN 294 million active, Yahoo 248 million active, Skype 309 million total, 12 million speak online etc. The most important decisive factor for an ordinary user when choosing an instant messaging system is the recommendation of a friend (most people start out using the same system that the majority of their friends are already using). The IMS are used for any kind of information exchange including communication between employees, students regarding their study or learning environment. For that reason this practice is included in the technology that contributes to the personalized learning environment.

2.2 Blogs

A blog is a type of web site in which entries are made as in a journal or diary and are displayed in reverse chronological order. Basically, an individual maintains his or her own weblog and it functions as a sort of personal online diary. Regular entries such as comments, descriptions of events, or other types of materials combined with text, images, and links to other weblogs and web sites are the typical ingredients of weblogs. Blogs have gained a lot of attention in educational circles, where they are experienced as tools that support several pedagogical aims and scenarios, ranging from individual knowledge management and competence development to group-based learning activities. Therefore, blogs have become an important educational tool in recent years, providing an opportunity for both facilitators and employees to publish their ideas, essays or simply as a space to reflect upon their particular learning process and reading material. In the context of teaching and learning, blogs can do much more than just deliver instructions or course news items to employees. They can be an interesting collaboration tool for employees who can join relevant community and find people to collaborate with, and give feedback to management and others. The most frequent use of blogs

in a learning environment is the publishing and sharing content with others. Blog technology can be improved by plug-ins such as FeedBack tool [19] used to track and integrate the content of other authors within one blog. FeedBack is a standard plug-in piece of code developed within the framework of the iCamp project [26] (www.icamp-project.eu). In a simple way it is used to enable blog users to subscribe to each others' blogs. Blogging technology, in combination with innovations such as the FeedBack specification, has definitely high potential to be considered as a powerful tool for learning with others [20].

2.3 Video-Wiki and Xo-Wiki

Publishing or presenting someone's thoughts online usually means writing some text and illustrating it with pictures. Still, the most natural form of communication for humans is face to face and for most people the majority of information is presented orally, where facing directly the presenter and his or her non-verbal information is often even more important than their actual words. Video could serve as a replacement for face-to-face presentation, since it is able to convey visible behaviour and important non-verbal information. In the past, recording a video and getting it to the target audience was quite a big challenge. Depending on the number of intended users, TV broadcasts or video tapes could be used. Employees, taking part in an e-learning course work in groups are suggested to form groups by getting to know each other and by discovering some common topic. The mentor/tutor usually gets use of VideoWiki to record some short self-introduction videos in which employees are presenting their background, explaining what their expectations are regarding some specific topic for the group assignment. VideoWiki [20] is based on the Red5 open-source Flash server, written in Java and Flash. It allows video recording, searching and playback through the main system web page or via standard URL links. VideoWiki also provides RSS feeds for each NameSpace or Author and videos can be embedded on any web page using special code snippets. Collaborative creation and maintenance of knowledge artefacts is one of the emerging phenomena of online internet communities, as prominent examples such as Wikipedia.org, MediaWiki.org, LyricWiki.org, Microformats.org and Wikitravel.org. Besides, a collection of web pages (a so-called wiki) can be very useful for teaching and learning purposes, for instance if learners need to collaborate to work on certain topics or if facilitators wish to develop and share their learning content with others. Consequently, a contemporary approach to e-learning requires tools which wouldn't enable learners to work on artefacts collaboratively, either by allowing them to publish small posts which can

be reused and combined with others, or by providing real wiki functionality. XoWiki is one such wiki implementation, realized as a component of OpenACS (Open Architecture Community System), a framework for building scalable, community-oriented web applications. XoWiki includes a rich text editor for easily creating and editing wiki pages and provides features for structuring, commenting, tagging and visualizing wiki-based content [20].

2.4 Doodle

When employees are working on a project together they need to divide tasks among the members of a group and monitor the progress of the project. This requires from the employees to engage in collaboration, discussion and decision making processes. In the context of bringing different cultures, educational systems, levels of teaching, languages and technology skills into a common virtual learning space, planning a series of meetings several weeks in advanced may very simply not work. Taking this into account, employees must adopt a simple solution to meet their needs. There are plenty of solutions which can help to make project to run smoothly. One of them is Doodle. Doodle can be described simply as a web-based tool for finding suitable dates for appointments with other people. Doodle allows employees to plan their meetings with partners, suppliers and other employees. In addition to time management, it can be used to vote for any other issue that arises as part of the distance learning process: for example, the literature that needs to be selected and analysed in order to complete a particular task [20].

2.5 Searching the Net: ObjectSpot

ObjectSpot [20] is a meta-search engine designed to facilitate different types of research. It can be used to find publications and other learning resources on the web. ObjectSpot realizes federated searches over an ever-increasing number of digital libraries and learning object repositories. It provides access to more than 10 million learning objects spread across famous libraries such as the Directory of Open Access Journals (DOAJ), OAIster, EBSCO, ACM, CiteBase and IEEE. Some of these repositories are open access, whilst others require registration or a subscription.

2.6 RSS

RSS (most commonly expanded as "Really Simple Syndication") is a family of web feed formats used to publish frequently updated works – such as blog entries, news headlines, audio, and video – in a standardized format [21]. An RSS document (which is called a "feed",

"web feed" [22] or "channel") includes full or summarized text, plus metadata such as publishing dates and authorship. Web feeds benefit publishers by letting them syndicate content automatically. They benefit readers who want to subscribe to timely updates from favoured websites or to aggregate feeds from many sites into one place. RSS feeds can be read using software called an "RSS reader", "feed reader", or "aggregator", which can be web-based, desktop-based, or mobile-device-based. A standardized XML file format allows the information to be published once and viewed by many different programs. The user subscribes to a feed by entering into the reader the feed's URI or by clicking an RSS icon in a web browser that initiates the subscription process. The RSS reader checks the user's subscribed feeds regularly for new work, downloads any updates that it finds, and provides a user interface to monitor and read the feeds.

3   General approach and methodology

In accordance with the situation set out under the previous point, the »e^4 VET« project is primarily aiming at the promotion of the attractiveness of VET schools by establishing an **EduCenter** (www.educenter.eu) by connecting different educational open source systems and Web 2.0 tools and providing interoperability amongst them. The project offers teachers of general and vocational subjects in VET, mentors of practical training in schools and enterprises, and teachers specializing in adult education and training both innovative and easy-to-use tools for developing e-learning materials, collaboration and interaction as well as access to a broad variety of e-learning materials. EduCenter (Fig. 2) is available in Slovene and English language.

Fig. 2: The EduCenter entering page

»e^{4}VET« project will improve the ability of teachers in VET to make pedagogical use of ICT, through the establishment of an EduCenter providing authoring tool, learning management system, collaboration tools and guidelines for teachers. Improved teachers' training is crucial factor in achieving the expected impact on the quality and efficiency of VET.

3.1   Target Groups
As the VET schools work in close cooperation with enterprises the curriculum design has already undergone the process of decentralization, open curriculum design and quick adaptation to the needs of economy is necessary which all result in the demand of non standard and untraditional preparation of contents. With this in view, the basic target group of the project on the narrower scale are:

- **Teachers of general and vocational subject in VET schools**, career counsellors, tutors and also managers of schools, where appropriate. Due to the different methods of teaching of vocational subjects in VET schools (stronger applicative value to the branch of studies teacher needs flexible tools to produce specific materials adopted to special needs of pupils);
- Following the decentralisation of curriculum design and modularisation of the curricula, the e-learning materials are often produced and developed together with the enterprises, so on the larger scale the target group are **mentors of practical training in schools and enterprises who design the e-learning materials together**. Practical education and training is one of the most important parts of VET; the methods of open curricula design demand common work of school mentors with expert teams from enterprises; as the curricula change regarding to the modernisation of technology the free and open system is most convenient for this work.
- The third target group are **teachers specialized in adult education and training**, because VET schools often train adults which demand different, adopted methods of work. Adult learning demand special methods of curricula design and special methods of work and the adoption of the curricula, which could be mostly rationally done by e-tools.

3.2   Collaborative EduCenter
This paper introduces the EduCenter framework, which is built on already existing innovative systems and some new tools and integrates four main parts:

- **E-learning Solutions,**
- **E-learning Environment,**
- **Communications,**
- **Content Repository and**
- **Other Tools.**

From the point of view of the concrete implementation it means that already developed e-learning tools and free and open source systems (Learning Management Systems, Learning Content Management Systems, an e-learning brokerage system for exchanging e-learning materials, authoring tool for production of e-learning materials, communication tools, etc.) will provide the EduCenter used by VET schools and teachers.

The Simple Query Interface (SQI) developed in the ELENA project (www.elena-project.org) will be extended for the purpose of connecting different systems and tools into EduCenter.

Fig. 3: The EduCenter main elements

3.2.1 E-learning Solutions
E-learning solutions means to transform ideas and information into innovation, action, and education success through engaging content, flexible delivery, and rapid deployment.

»e⁴ VET« e-learning solutions include different open source authoring tools (content creators). The e-learning authoring environments assist teachers in the design, development and publishing of web-based learning and teaching materials without the need to become proficient in HTML or complicated web-publishing applications.

Content Creator integrated in EduCenter (Fig. 4) is a simple innovative tool for multimedia content development, which enables teachers to use the developed content in their face-to-face lessons or as reusable learning objects (RLOs) in e-learning [9].

Easy to use tool enables teachers to insert text, picture, video material and PowerPoint presentations, also allowing the integration of pictures and videos from online libraries Flickr and YouTube. Content creator offers multimedia support through the use of templates and timetable.

E-learning content that you create with Content Creator is distributed as flash or HTML and delivered through almost any Learning Management System (LMS) available.
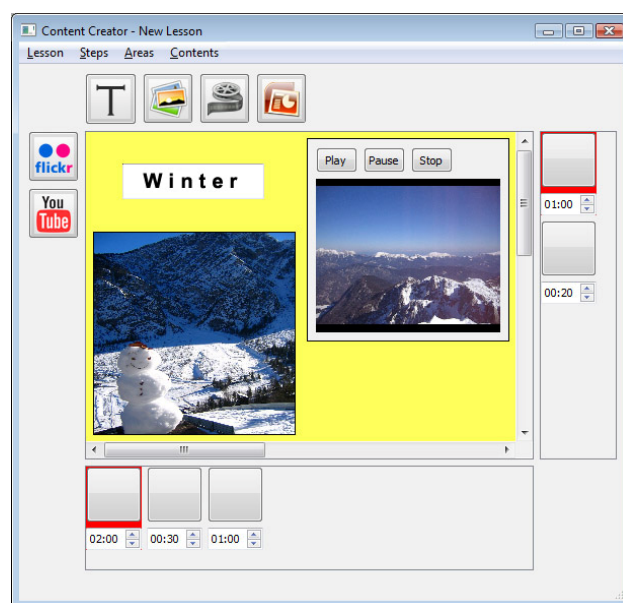

Fig. 4: The »e⁴VET« Content Creator

The Content Creator is suitable for specialists and tutors in educational institutions. EasyCoBu is designed to build quality e-learning content quickly and easily. Quick and easy solution in building e-learning content:
- setting up a structure of complete e-learning content;
- selection of pre-designed graphic outline and navigation elements;
- inserting chapters, lessons, steps;
- inserting graphic material;
- inserting text;
- inserting video and audio recordings;
- inserting animations;
- attaching files;
- inserting links;
- packaging for import into various L(C)MS.

3.2.2 E-learning Environment
E-learning environment provides the system which enable social learning experience. For the learning environment an open source Learning Management Systems, such as Dokeos (www.dokeos.com), Moodle (www.moodle.org) or others will be used and connected with other parts of the EduCenter.

One of the main project objectives is to develop two e-courses: (1) *How to develop e-learning content with content creator*, (2) *How to become a successful e-tutor* and to train at least 60 teachers of general and vocational subjects in VET, mentors of practical training in schools and enterprises for the use of EduCenter in all the 3 partner countries.

E-learning courses used in »e⁴VET« project combine the most effective traditional teaching methods with new information technologies. E-learning model is based on blended learning methodology, which allows the building of the efficient combinations of traditional and new methods of learning and training. The major principles of e-learning model used in »e⁴VET« project are [4, 5]:

- combination of face-to-face learning and e-learning (6 face-to-face sessions in a course);
- combination self-learning and interactive learning (active role of students);
- course (60-hours) is built by module system and uniform structural model;
- full learning and instructional support.

To organize the learning process, the e-learning environment has been developed. The model of e-learning environment is presented on Fig. 5 [25]. For the high effectiveness of educational process the e-learning environment is taking into account both pedagogical principles and ICT possibilities [28, 27]. E-learning environment could change the process of learning *from a passive to an active* one, encouraging regular communication between learners and tutors [6]. It takes the synchronous and asynchronous collaboration capabilities of the Internet and integrates them within tools that mirror the instructional process.
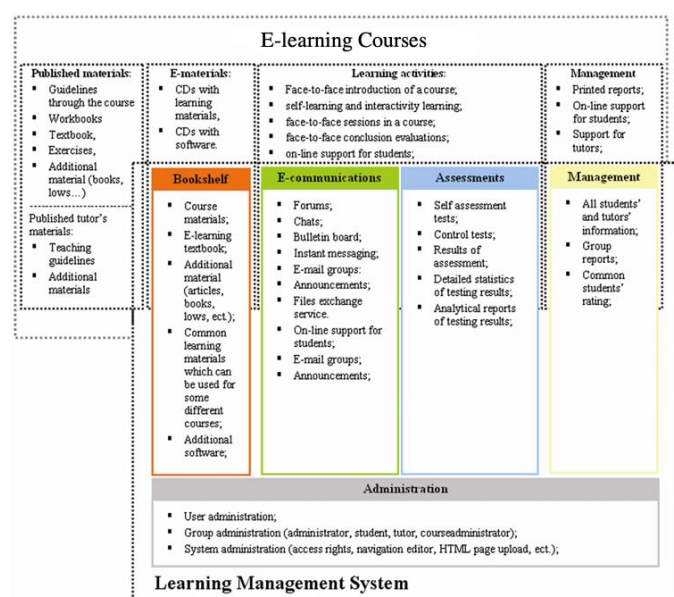

Fig. 5: The »e⁴VET« e-learning environment

To create an effective and appropriate online learning environment for the defined target group in the project we consider a few practical and pedagogical issues, including the recognition of prior learning, self-assessment, diagnostic tests, the online roles of tutor and student, the best type of support technology tools to use, and the process of collaboration. It is also important to consider how e-learning materials will be distributed to students, how students will be assessed, and how specialized software will be incorporated into the learning environment. These practical and pedagogical aspects are presented in more detail below.

- **Reception**. Learners have different backgrounds and different needs. At the beginning of the course students needs to establish goals, become aware of their own needs and grasp the objectives of each course [25].
- **Roles**. The tutor should accept the role of facilitator (as opposed to leader) in the learning process. This change requires moving from the "chalk-and-talk" role to a "guide-on-the-side" role. It is also important that tutors realize that e-learning requires high motivation on the part of the students [25].
- **Support technology**. Students should have access to a standard web browser, Internet connection and username and password of the e-learning environment [25].
- **Collaboration tools**. Effective collaboration between the tutor and students is crucial. Tutors should be familiar with the many Internet technologies that support effective communication and collaboration, including e-mail, group discussion lists, text-based chat facilities, and even videoconferencing [25].
- **Material distribution**. Developed e-learning environment provides a platform for delivering not only the text materials, but the multimedia requirements as well, including audio and video streams of tutors lectures. Tutors should be familiar with the strengths and weaknesses of current technologies [25].
- **Methodology**. Flexible learning is not a question of telling students to do whatever they want and whenever they want to (as some teachers fear). Flexible learning is about providing individual students with the kind of material, tutoring and guidance that suits theme best [23].
- **Student assessment**. Computer-based testing can provide instant feedback on student comprehension of course materials. But this type of managed testing can not work unless tutors

accept assignments and provide feedback to students electronically [25].

- **Specialized software**. In some cases, course contents might dictate the choice of specialized tools to improve course comprehension and communication. For example, collaborative tools are now available that support shared workspaces along with application-sharing capabilities across the Internet [25].

3.2.3 Communication

When we are talking about e-learning we cannot overlook the impact that Web 2.0 technologies are bringing to the process of e-learning [7]. Web 2.0 technologies are changing the way messages have been spread across the web. A number of online tools and platforms are now defining how people share their perspectives, opinions, thoughts and experiences [8]. Web 2.0 tools such as instant messaging systems, blogs, forums, RSS, video casting, social bookmarking, social networking, podcasts and picture sharing sites are becoming more and more popular. Therefore we include some of them (instant messaging systems, blogs, video-wiki, forum, RSS) in our EduCenter.

3.2.4 Content Repository

The core of the online learning is the content itself. As the web is a multimedia format, and people learn in various ways, there is a strong consensus that formal learning content should be presented in media-rich, high-quality learningware. To facilitate the broader flexibility of online curricula, most experts advocate breaking the teaching content into smaller chunks, so that they enable the combination in unique ways for each learner. One of the popular strategies right now is to use "reusable learning objects" (RLOs), a concept borrowed from computer programming, in which objects are used and reused with appropriate adaptations for their context [9]. In the project, the e-learning content repositories such as the Universal Brokerage Platform (UBP) that form the basis of EducaNext (www.educanext.org), an academic exchange portal for learning resources sharing was used. The objective of the project is, namely, to produce at least 120 reusable learning objects of e-learning materials under Creative Commons License (http://creativecommons.org) for identified VET sectors, including the interactive »e-modules« (following the decentralisation of schools and modularisation and open curricula methods).

3.2.5 Other Tools

Web 2.0 technologies will lead to a more student-centred teaching and learning approach. Instead of memorizing, students will have the possibilities to gain more freedom for creativity. Blogs have become an

acceptable educational tool; they are more reflective than MySpace, for example, which has a strong relation to leisure. Wikis also fit quite well into collaborative projects and are common in education today. Students share their work in Wikis, which is very useful in distance education, but even in campus education. The third important element is social bookmarking. After their research, students share bookmarks of good sites, and RSS feeds make it easy to track these pages. Last but not least, communication tools like Skype enable the students to communicate for free and share their results, even in groups.

3.3 The added value of »e⁴VET« project

The project offers concrete answers to some main priorities related to the role of education and training in EU level. The added value of the project is:

- the **cost effectiveness** in transferring the above portal to the network of VET schools, offering a thesaurus of e-learning materials that will be free of charge exchanged produced in various European countries. A large range of e-materials developed under the CC license, gathered in the online community portal, ready to be used by other community members offers a great possibility of spreading knowledge and experience around Europe;
- **greater motivation, awareness and ICT competences** of teachers, easy access to e-learning materials and their optimum adoption to individual pupils needs, reduction of the psychological burden of pupils and quick responsiveness of curricula to the demands of enterprises and labour market.

4 General impact on end users and target groups

In the short term perspective, the project results will contribute in establishing advanced VET practices focused on advanced e-learning and improved EU competence resources in regions throughout Europe. An innovative EduCenter will enable trainees to go through on-line courses regardless of their location and occupation. The multilingual nature of the system will welcome a great number of potential users and the partners will make all necessary efforts to increase its usefulness.

The long term impact is focussed on modernising and upgrading of the existing VET provision in e-learning and the adequate VET teacher training with the possibility of further dissemination to grammar schools and upper grades of primary schools in Slovenia and

abroad. New partners will be invited to join the EduCenter during and after the end of its implementation. The sustainability will be insured by systematic implementation into national system and upgraded by means of EU Social Fund:

- E-learning as an integral part of learning process;
- Further networking on the regional, national and EU level and establishing of new types of partnerships based on ICT competences;
- Establishing system for developing ICT competences of teachers within national and EU priorities;
- Strengthening the team work of teachers in schools and between similar schools;
- Elaborating bases for recommendations for e-learning within national system (by Ministry of Education and Sport of Slovenia);

The whole philosophy behind the project design and implementation presupposed is the creation of a self sustainable and expanding EduCenter, fostering VET institutions and teachers for significant impact on the quality and efficiency of VET.

5   Recommendations for further development

Based on the findings of the case study [15] and »e^{4}VET« project [18], the results of the project could be streamlined in a form of "Recommendations", which will include the following items [24]:

- The process of in-service teacher training should systematically involve areas of ICT which will enable teachers and educators to understand the advancement of new technological tools, such as the Web 2.0 tools and the benefits it brings for the learning environment.
- Supporting teachers' and educators' concern that the learning environment cannot be filled only with contents defined by the educator (e.g. PPT files), and that the contents could evolve as part of the student-defined activities.
- With the view of further development it is necessary to overcome doubts related to open social publishing, dealing with copyright issues and fears about the quality of learning materials produced by means of e-learning which should become an integral part of the training process and the endeavours for the quality in education and training.
- Strengthening the process of reducing the self-directed learning and change projects in an interwoven way in order to increase the chances

for students to be able to use these skills later in similar contexts in their working environment, should be promoted as a desirable attitude.
- Integrating individual and collaborative assignments to deal with individual self-reflection and group-level reflection and activities at both levels should be introduced in the professional learning process.

6   Conclusion

The project offers concrete answers to some of the main priorities related to the role of education and training in EU level. Through the structure of partnership the project supports the overall strategic EU triangle education, research and innovation. By aims and objectives and concrete outcomes it is in line with the recommendation on key competences of teachers (ICT as one of the 8 competences), Green paper on innovation, European Framework of qualifications, Modernization of Schools and hereby strengthening the role of ICT in promoting the lifelong learning in Lisbon strategy.

The »e^{4}VET« project is aimed at strengthening the VET infrastructure in Slovenia and abroad and ensuring a sustainable solution on the transnational level. Since the EduCenter is not creating an additional Learning Management System, but facilitates interoperability, a main advantage is that VET institutions and teachers can continue to use and further develop their systems, while at the same time connect to other systems and offer a wide collaboration space for their users. The up-take will thus be much easier. The fact of VET institutions and teachers from several countries connected in one place – EduCenter – offers a great variety of different e-learning materials which can be used all around Europe if translated in local languages and adopted to national curricula. Adopting and not always creating e-learning materials from scratch can save a lot of time and enables sharing experience and knowledge among teachers and schools.

It is our firm belief that the »e^{4}VET« project could have a large influence on the activities of continuous education within the VET programmes in Slovenia and Europe so that lifelong learning becomes a well-known and widely used paradigm in the continuous training systems.

There are two areas which Europe recognized as important weapons to cope with globalization challenges: the empowerment of institutions, including education institutions, and developing effective innovation strategy and creativity. Both areas could only be efficiently tackled by the best use of ICT technology and development of e-learning. With this in view, the project focuses on creating an innovation and ICT -

friendly environment for VET institutions to follow these two European priorities. With its transnational partnership the project promotes the EU recommendation of *"Creating the innovative Europe"* and is closely linked with the intention of the European Commission to recognize the year 2009 as the year of innovation and creativity. VET sector is, namely, the most sensitive to the changes in labour market and economy, and as such most appropriate to implement the above EU priorities.

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