E-learning in a rural context: Alternative media and contemporary applications

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Foreword

This report has been written as part of the E-ruralnet –project that addresses e-learning as a means for enhancing lifelong learning opportunities in rural areas, with emphasis on SMEs, micro-enterprises, self-employed and persons seeking employment. E-ruralnet is a European network project part-funded by the European Commission in the context of the Lifelong Learning Programme, Transversal projects-ICT.

This report aims to address two issues identified as requiring attention in the previous Observatory study: firstly, access to e-learning for rural areas that have not adequate ICT infrastructure; and secondly new learning approaches introduced through new interactive ICT tools such as web 2.0., wikis, podcasts etc. The possibility of using alternative technology in addition to computers is examined (mobile telephones, DVDs) as well as new approaches to learning (simulation, serious games).

The first part of the report examines existing literature on e-learning and what e-learning is all about. Institutional users, learners and instructors/teachers are all looked at separately. We then turn to the implementation of e-learning from the organizational point of view and focus on quality issues related to e-learning.

The report includes a separate chapter or e-learning from the rural perspective since most of Europe is geographically speaking rural and the population in those areas is that which could most benefit from the possibilities introduced by the e-learning development.

The section titled "Alternative media", in accordance with the project terminology, looks at standalone technology that is of particular use to rural areas without proper internet connection. It also evaluates the use of new tools and media in e-learning and takes a look at m-learning. Finally, the use of games, serious games and simulations in learning is considered.

Practical examples and cases are displayed in a box to facilitate pleasant reading.

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1.   E-learning

E-learning can be defined as learning facilitated by ICT (Ellis, 2007): computers, Internet, audio (radio, podcasts), video (tape, DVDs), satellite broadcast, interactive TV, CD-ROM, telephones etc. Many institutions already use a vast array of electronic tools related to providing learning: Internet, Intranet, course management systems, Office programs, calculators, electronic calendars, e-presentations and e-mail even if they do not advertise using e-learning tools.

So what is all the e-learning hype about? As work, studying and life in general have become mobile, solutions to be able to informally and formally learn on-the-go are needed (see Devi, 2006). E-learning allows students to study independent of time and place, facilitates access to experts and enables communication with peers. In a knowledge economy, e-learning fosters key skills such as updating work-related skills, finding and processing information, working with new technologies and working in teams (see Mason & Rennie, 2004).

Asynchronous (on demand) e-learning enables reproducing the learning event multiple times after creation to maximize cost-efficiency. Synchronous (online) e-learning enables participants from different locations to participate in training saving them travelling costs. E-learning places learners in a proactive role and gives them access to a wide range of materials and methods. The advantages of e-learning are flexibility, efficiency and equality. At its best it is also very convenient for all involved parties.

Although the flexibility provided by e-learning is a significant incentive in lifelong learning, there is much more to e-learning than freedom. E-learning enables students to network and learn from each other in interactive forums as well as develop new forms of learning. E-learning enables students in rural locations to participate in training, especially in niche fields where local training may be completely nonexistent. E-learning is also expected to increase the quality and cost-effectiveness of learning while reducing costs (see Gunasekaran et al., 2002). Ideally, e-learning eliminates the barriers of time, distance and socio-economic status (Gunasekaran et al., 2002). It also enables people and organizations to keep up with changes in the global economy (Harun, 2002). The meaning of real-time access to information can't be neglected in contemporary economy.
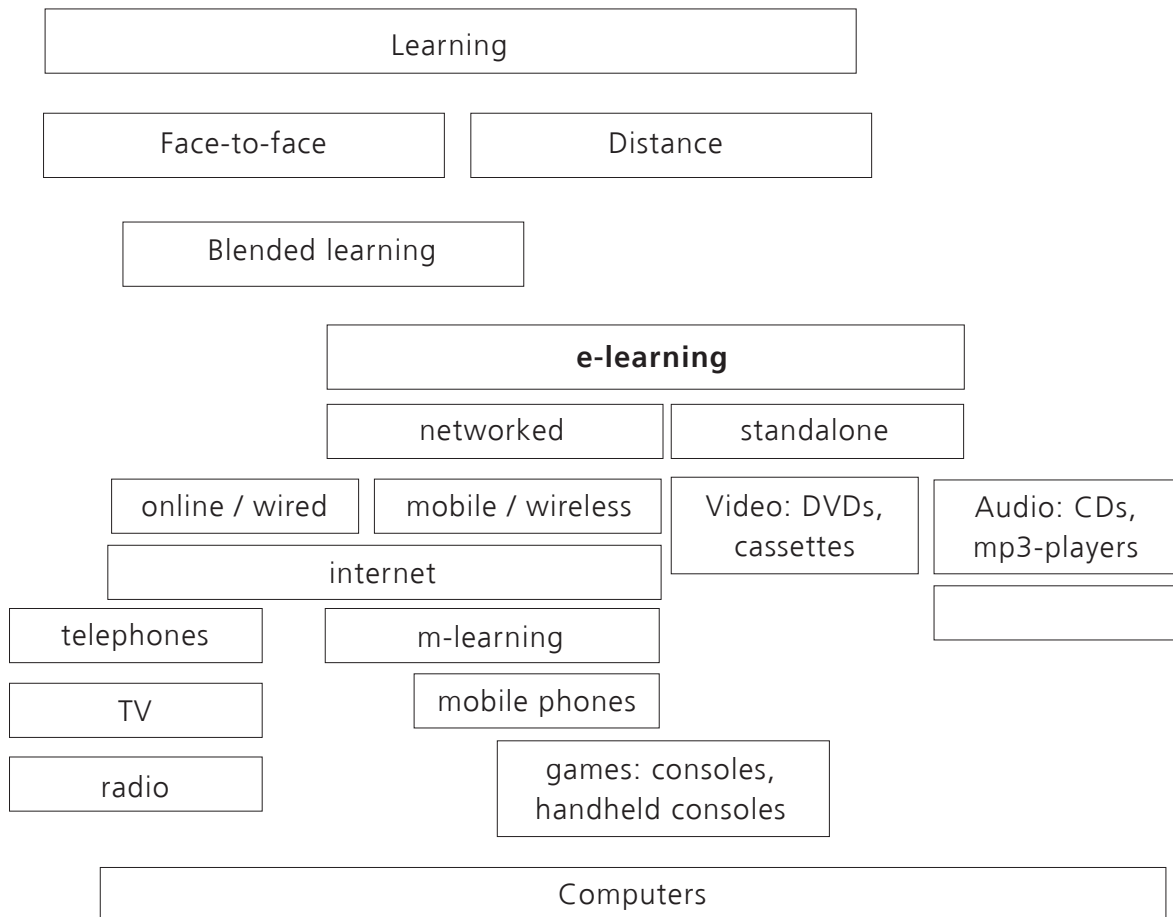
The e-learning market includes researchers, business-customers, consumers, IT-providers and educational organizations. E-learning can be conducted in many forms: single courses, course components, entire programs, (see Barker, 2007) and many methods: e-lectures, web-based learning, virtual classrooms, digital collaboration etc (see Shee & Wang, 2008) and many pedagogical approaches: student centered learning, learning by doing, collaborative learning, distributed learning, flexible learning etc. (Beyth-Marom et al., 2003). Blended learning (also known as "hybrid learning") refers to mixing learning environments, i.e. combining face-to-face and e-learning elements. Even traditional teaching these days utilizes various electronic materials such as PowerPoint-presentations, DVDs and audio. One popular form of blended learning is arranging at least one face-to-face meeting before proceeding with the online collaboration in order to introduce the students and lecturers to each other.

Many authors have noted that e-learning is still *learning* and ICT does not cause learning to happen. Learning continues to be "*an active, constructive and goal oriented process which is enhanced by sharing and equality during discussion*" (Ladyshewsky, 2004). The process of learning is traditional to an extensive degree. McLoughlin (2000 in Ladyshewsky, 2004) points out that IT should be used to *increase human interaction*. E-learning can be both formal and informal.

E-learning differs from traditional distance learning mainly in speed and interaction. It facilitates reflective learning both in physical contact and distance contexts. Student demography is changing and processes for life-long learning must change as well. There is now a technological opportunity for learning to develop beyond face-to-face contact and still remain real time, efficient and successful. Research supports e-learning success (Ladyshewsky, 2004) but is also hard to evaluate due to numerous variables: e-learning and face-to-face learning in different contexts and with different subjects are quite impossible to compare. Distance learning is argued to make learning more accessible, more convenient, more effective, and more cost-efficient for both the students and the provider (Barker, 2007).

But what matters in the end is the outcome. If the students opt e-learning and instructors find that it works, it is worth promoting as an option or an addition to traditional learning. It has even been proposed that communication in e-learning may have greater quality than in traditional learning (Dewar, 1999). E-learning is also environment-friendly in saving paper and travelling.

2. Typology

| Learning |
| Face-to-face | Distance |
| Blended learning |
| **e-learning** |
| networked | standalone |
| online / wired | mobile / wireless | Video: DVDs, cassettes | Audio: CDs, mp3-players |
| internet |
telephones	m-learning
TV	mobile phones
radio	games: consoles, handheld consoles
Computers

Distance learning can be delivered to users via electronic or other channels. E-learning in turn can be purely distance learning or blended learning including some elements of face-to-face interaction. E-learning can be divided into standalone or networked systems. Most people in the information societies these days have some sort of access to networked devices and material such as Internet, mobiles. These networked materials can be accessed either through wired or wireless communication. Also tradition

electronic apparatuses such as telephones, TVs and radios require some sort of connection to the outside world.

But there are still vast areas and numerous people without feasible access to online resources. E-learning is still possible via standalone systems such as DVDs, e-books, mp3-players and downloadable material like games and files.

Computers can be used online or offline. The biggest advantages in online systems are synchronous communication and continuous updates.

Institutions

With increased demand for lifelong learning there is also increased competition between institutions offering educational opportunities. There is a pressure to rethink how content is delivered. Concannon et al. (2005) write that reward structures, lab times, content design, computer access and technical support affect how students perceive the quality of e-learning and are issues that organizations can influence.

Sambrook (2003) has studied e-learning in rural SMEs and concluded that e-learning requires a positive attitude from both the learners and the employers. Online courses have been found to be effective only when educational providers and enterprises collaborate. She remarks that rural SMEs represent the majority of European businesses and provide most of the jobs as well as turnover. What is characteristic for SMEs is that they focus on the informal transfer of job skills rather than formal training. Time and lack of relevant provision are typical barriers to SME training. Lifelong learning requires that also the employees of SMEs invest in learning. E-learning can help overcome issues of time deficiency and remoteness.

Work-related learning consists of *outside work* (related to work but takes place elsewhere), *at work* (formal courses etc.) *and in work* (learning from work processed) learning (Sambrook, 2003). One challenge for SMEs is finding enough monetary resources for required technology and software. Sambrook (2003) also identified the following problem with SMEs ability to embrace e-learning: lack of hardware, lack of e-learning expertise, lack of time, lack of resources, lack of trust, difficulty in determining full cost of e-learning and differences in terminology. Difficulty in determining e-learning costs is particularly noteworthy since it differentiates business clients from private consumers for whom the prices are often clearly stated and packaged.

Sambrook (2003) listed factors learners associate with SME-relevant e-learning material (*adapted*):
- User friendly: material easy to use, clear instructions
- Presentation: accurate, no errors
- Graphics: number and quality of images
- Interest: interesting on boring content
- Information: amount and quality of content
- Knowledge: new knowledge
- Understanding: easy or difficult material
- Level: appropriateness
- Type of learning
- Language
- Text: balance of text and graphics

Harun (2002) notes that a significant part of e-learning takes place in the workplace. The demands of the knowledge economy also require that people constantly obtain, assimilate and apply knowledge as well as develop their capacity to learn. Learning at the workplace is essential for both the employee and the employer. The strength of e-learning for organizations is in its' applicability to all work-related training from updating skills to obtaining product information knowledge and new employee orientation. The quantity of information available these days requires workers to be adept in using and evaluating it. The new communities of practice, accessible also internationally and online, are becoming significant networks of informal learning.

Brown (2003) argues that there is a need to enable learners to find existing knowledge, integrate this knowledge in their work and share it with others. He notes that e-learning with its rich interaction opportunities is a good tool for this.

Animal Welfare training at the University of Barcelona[1, 2]

The University of Barcelona has developed e-learning from the late 1990's and has consolidated its online and blended training in different areas of expertise (business, health, environment, engineering, education, etc) since the beginning of the Millennium. More than 300 courses have been organized and over 25,000 students have attended these modalities.

The Animal Welfare training program addresses the training needs of the agricultural sector via new tools and emerging technologies (social networks, 3D environments, virtual worlds) and different media suitable for e-learning delivery (PC, mobile phones, PDAs, mp3-players etc.). It seeks to train people involved in animal handling about the opportunities to use new technologies, and to create tools and training content.

The pilot course was launched in 2009. It was addressed to farmers with the objective to develop skills related to care of farm animals. The training program was specifically designed to facilitate access to e-learning for a target group without developed ICT-skills or previous e-learning experience and attention was paid to creating guides and manuals and assigning tutors. The training incorporated many medias such as game-based learning with an iPhone, course management with Moodle and social networking via Ning as well as multimedia content and micro videos. The use of various media facilitated fluent interaction and the training program generated demand for e-training in other fields as well.

Learners

Contemporary learners are students of all ages and all possible life situations. People are seeking flexible forms of learning at different stages of their lives. E-learning allows students to choose courses from the most appropriate providers instead of the providers they are geographically tied to. Students may also combine their curriculum from multiple providers. (See: Concannon et al., 2005)

It is important for the students' future learning endeavors and learning success that the e-learning experience is a positive one. Lee (2010) shows that user satisfaction is the prime indicator of the user's probability of trying e-learning again. Perceived usefulness, attitude and concentration also influence future e-learning efforts. Lee (2010) recommends that full use of the Internet's multimedia capabilities and

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[1] http://www.il3.ub.edu/es/Home.html
[2] https://eruralnet.dabbledb.com/page/eruralnet/YRmoTSse#

collaborative tools should be made in order to encourage students' e-learning experiences. Lee (2010) also notes that learning should be creative, and fun to facilitate flow.

Paechter et al. (2010) researched students' expectations and experiences of e-learning and found that the students' own achievement goals were the best predictors of success while the students' evaluation of the teacher's skills and support influenced learning and satisfaction. Their results highlight the importance of student instructions and teacher training.

Yukselturk & Bulut (2007) found that successful students use self-regulated learning strategies (context online course). Some research also discovered that students that have an internal locus of control, i.e. take personal responsibility, may succeed in distance learning (Dille & Mezak, 1991; Parker, 1999; Stone, 1992 all in Yukselturk & Bulut 2007). The importance of self-regulation is explained by the contemporary goal of educating independent and self-regulated learners. Self-regulated students attempt to control their behavior; to accomplish a goal and; master their learning (Yukselturk & Bulut 2007). In the research by Yukselturk & Bulut (2007) intrinsic goal orientation, task value, self-efficacy, cognitive-strategy use, and self-regulation were significantly positively correlated with online success. According to Yukselturk & Bulut (2007) the link between learning styles and learning success are conflicting but motivation is crucial. The reasons behind failing to complete an e-learning course lie in the students' personal lives and unrealistic expectations of the workload. Research has shown that the students' motivation often decreased during the course.

Yukselturk & Bulut (2007) recommend that the following factors be acknowledged when creating online courses:
- Provide learners information on online learning and its requirements
- Direct learners to be self-regulated
- Give guidance on different environments and learning methods
- Make sure the students have access to instruction all through the course
- Monitor performance regularly and provide feedback
- Encourage interaction
- Check that the course contents have immediate real-life value for the students
- Assemble the course content of rich and updated materials

Concannon et al. (2005) studied what students feel are the benefits of e-learning. They report that even individual students approach to ICT-supported learning varies depending on context. Students valued peer encouragement and lecturer support in e-learning. They were also happy with ease of access to resources. Negative feelings arose mainly from technical challenges. Concannon et al. (2005) also found that students approach e-learning just like traditional learning but consider Internet as an addition resource. However, e-learning is changing the way students perform learning tasks: they browse demos in their own pace and continuously edit their texts.

Shee & Wang (2008) found that learners ranked the user interface as the primary decision criteria in e-learning. Interaction mostly takes place in the user interface and a stable, well-designed interface becomes crucial in determining learner satisfaction. Shee & Wang (2008) remind developers to pay attention to the learner requirements in designing learner interfaces. A second priority in e-learning decision making for students was content. Therefore great emphasis should be put on also other than technical issues and the expertise of many professions should be exploited. Students want to find useful data easily.

In web-based e-learning the learner's Internet experience affects the search results which may lead to different quality information between novice and experienced users (Wu & Tsai, 2007). Drop-outs from e-learning have been attributed to time dedicated to the course, external distractions (family-life), difficult materials and lack of social support (see Williams et al. 2005).

Less educated learners are less positive towards e-learning (Harun, 2002). The risk of e-learning for the student is in the illusion that e-learning would replace all other forms of learning and students would skip opportunities for face-to-face contact (see Demetriadis & Pombortsis, 2007). Learners have in some e-learning instances also felt alienated, lonely and frustrated (see Williams et al. 2005; Harun, 2002). Poor quality of transmissions can highlight feelings of alienation. Learning best takes place in a high challenge, low threat –environment (Harun, 2002).

Instructors

Yukselturk & Bulut (2007) have done qualitative research on e-learning instructors. The instructors they interviewed felt that online students were different from traditional students: they were older and had diverse backgrounds and various responsibilities. The instructors felt that successful students were self-disciplined, active, collaborative and aware of their responsibilities. According to the instructors the students' satisfaction with the course was linked to how quickly they were able to implement what they had learned. Students favored practical information. The instructors also saw flexibility as a challenge since it placed a lot of responsibility on the students and caused some students to fall behind. Designing and implementing online courses wasn't easy for the instructors either, as they have to update content and familiarize themselves with new tools and techniques. The instructors saw communication tools as essential in interactive knowledge creation.

The teacher's challenge in e-learning is creating coherent, structured and technically well designed learning material which also facilitates collaboration (Paechter, 2010). Blended learning also challenges the teacher to combine the best practices of both methods. The e-learning media facilitate different kinds of interactions than traditional courses: the students can be instructed to amend texts with their own point of view; find relevant information and links, discuss content on relevant forums; use and explore learning software (math, languages, music etc.), do actual research (in collaboration with international online laboratories); create content in Wikipedia and find content in online encyclopedias etc. Even though learners are in control in the e-learning context, support still needs to be provided. McLoughlin (2000 in Ladyshewsky, 2004) also remarks that material should be designed to engage students and the role of the instructor is to offer perspectives.

The rise of e-learning affects pedagogical approaches as well. **Constructivism** asserts that people create knowledge through social interaction. **Constructionism** in turn is an educational theory built around the assumption that learners understand the world according to mental models they have *constructed* and learn most efficiently when interacting with the world and experimenting. The focus is on the learner. **Social constructionism** highlights the influence of social relationships on learning: meanings are interpreted through social interaction. **Instructionism** is often contrasted with constructionism. Educational practices fitting the description of instructionism are teacher-focused, prescribed and skill-based (See Johnson, 2009) and often thought of as "old-fashioned" in the e-learning context. Instructors, teachers and facilitators of learning are faced with the challenge of approaching training in a new way where the learner is the doer and the instructor is the facilitator.

Communities of practice[3], often referred to in the context of social media in learning, are people who share an interest or a profession. These people group naturally or through organized steps to share knowledge. People in a community of practice learn from each other and become better professionals in their field through this joint learning. The communities of practice theory includes the notion of stimulation by the social context: passive observers gradually become active participants (see Wenger, 1998 and forward). From the community of practice perspective, the role of the teacher is not superior to the role of the student but all members learn from each other although experienced members are respected for their extensive knowledge of the community's speciality.

Examples of e-learning in different fields

Subject	E-learning activity
Army	Using simulations and games to rehearse for combat situations, team work and vehicle/equipment training.
Arts	Using design software, surfing for inspiration around the globe, accessing knitting patterns and instructions (text, pictures, videos), finding material comparisons
Business	Virtual company tours, business examples, reading consumer feedback on own and competitor products, scouting company brand image, keeping an eye on the competitors, business skill courses
Emergency services	Using simulations to practice emergency situation roles and coordination. Using video recordings of real-life situations to train decision-making and responses.
Engineering	Virtual laboratories, online software course, pdf designs and layouts, simulations of factory processes
Science	Collaborative mindmapping, writing papers as an international team (send versions by e-mail, post newest version on an intranet), finding material online, searching for partners
Medicine	Diagnosis discussions, simulations of procedures, recent findings and studies, conference proceedings, video recordings of lectures, statistical data, seminars
Agriculture	Crop tests
Law	Case studies, forums on laws under amendment, new court decisions
Social sciences	Joint analysis of qualitative/quantitative data with shared analysis software, discussing plausibility of conclusions in online communities of practice
Philosophy	Reflection with colleagues on forums
Physical education	Training schedules on online databases, progress follow-up reports, technique guidance on YouTube
Languages	Online dictionaries, vocabulary tests, audio pronunciation guidance on mp3

(further developed from Gunasekaran et al., 2002)

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[3] http://www.ewenger.com/theory/

3. A critical look at e-learning
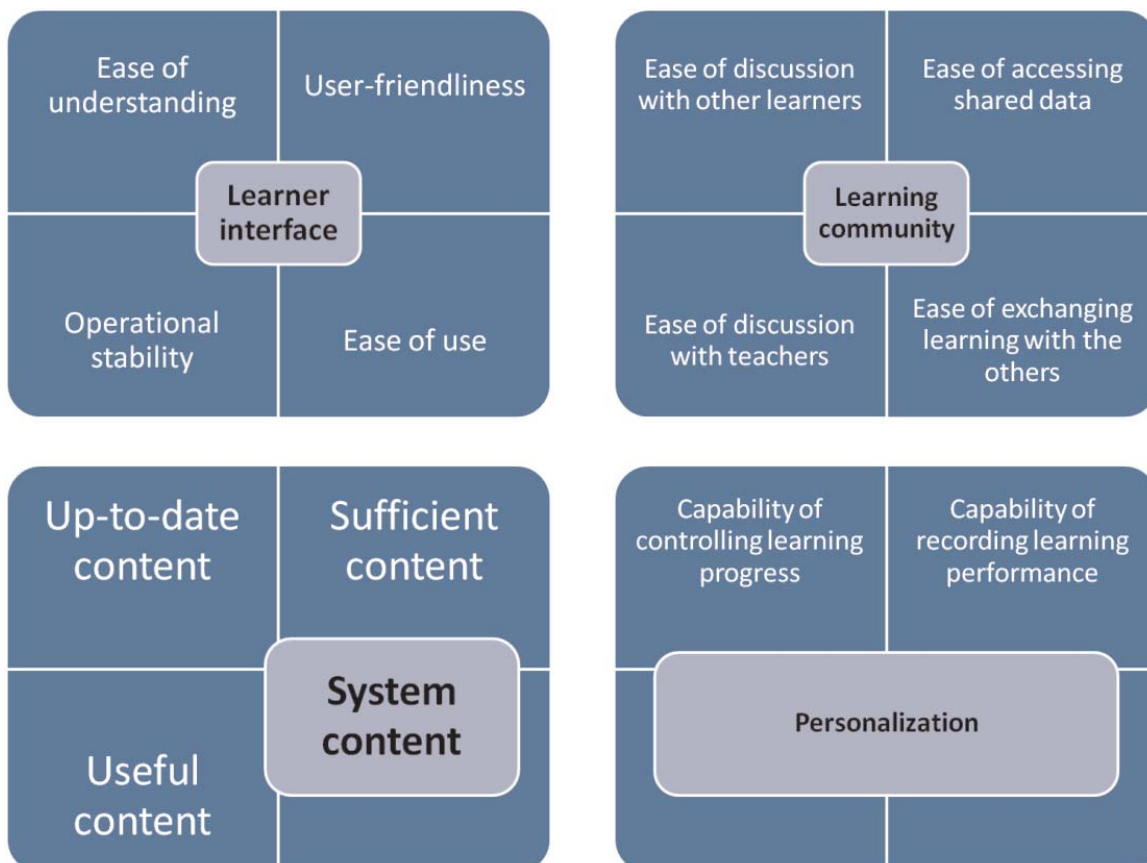
Implementation & quality

There is nothing mystical about adopting e-learning in the curriculum. Ellis & Calvo (2007) raise issues that need to be addressed when embracing e-learning:

1. **Decision** (purpose)
2. **Planning** (resources, technology)
3. **Development** (trialing)
4. **Teaching** (training, learning)
5. **Evaluation**

Although e-learning with the user-friendly tools and open access applications need not be hard, it is good to remember that getting acquainted with the processes takes time that must be adequately resourced (Ellis & Calvo, 2007).

The viewpoints to be acknowledged when implementing e-learning are <u>instructor </u>(competence, style, attitude), <u>student</u> (time management, discipline, computer skills), <u>IT</u> (bandwidth, security, network accessibility, audio and video plug-ins, authorization, licenses, Internet, instructions, videoconferencing) and <u>organization</u> (support) (see Selim 2007).

By adapting the Shee & Wang (2008) model for evaluating web-based e-learning systems, a following hierarchy can be drawn for evaluating e-learning:

Ease of understanding	User-friendliness
Learner interface	
Operational stability	Ease of use

Ease of discussion with other learners	Ease of accessing shared data
Learning community	
Ease of discussion with teachers	Ease of exchanging learning with the others

Up-to-date content	Sufficient content
System content	
Useful content	

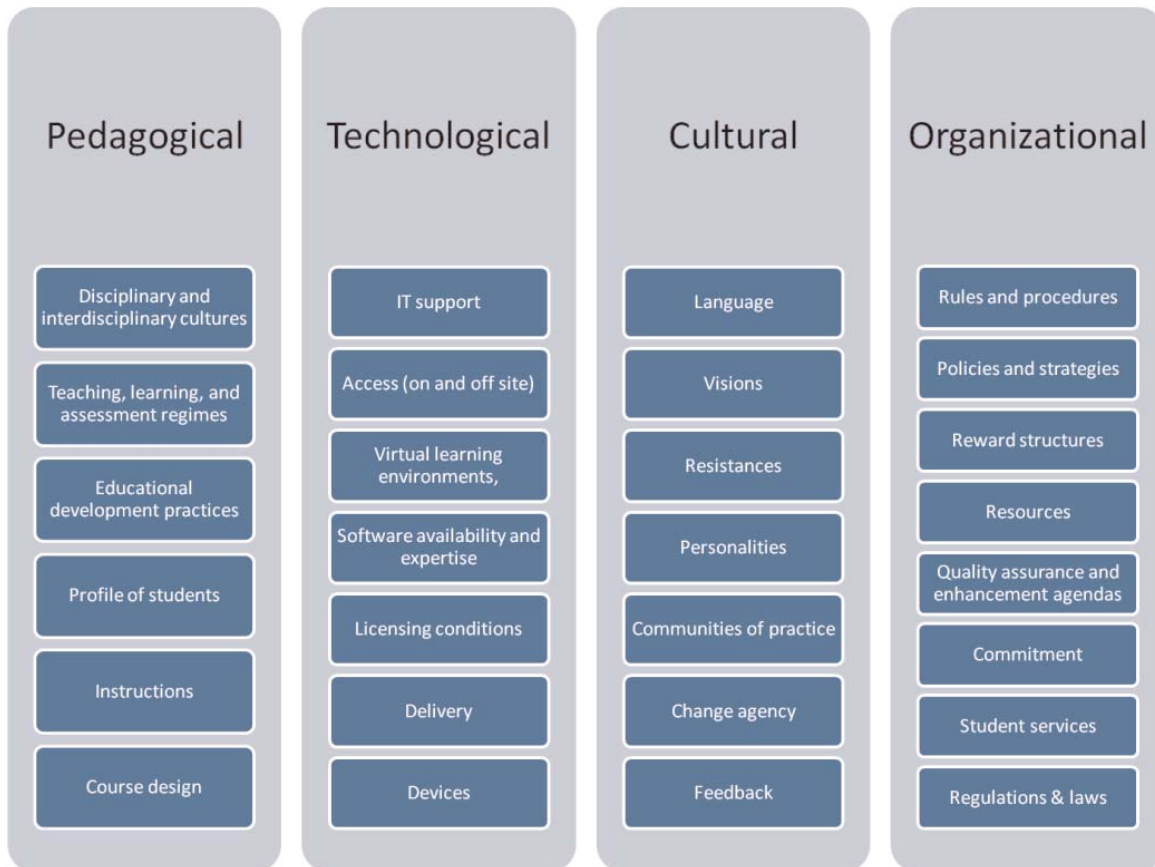| Capability of controlling learning progress	Capability of recording learning performance
Personalization	

Ladyshewsky (2004) draws attention to the pedagogical principles of e-learning: "*student-teacher contact (email and bulletin boards); active learning techniques (problem solving, inquiry and project based tasks); prompt feedback (person to person and within group); communication of high expectations (making criteria and learning outcomes explicit); time on task (fostering awareness of time constraints and making contributions relevant); respect for diverse learning communities (learners given freedom to control and explore); and reciprocity and collaboration among students (collaboration, peer learning and assessment).*" He also emphasizes the importance of keeping discussion room size limited.

Creating an online course can be time-consuming and expensive on the short-run although it is usually relatively cost- and time- efficient to run after creation. Creating expenses include subject experts, internet specialists, interface designers and copyright clearance whilst delivery expenses include servers, tutoring and administration (see Downes, 2001).
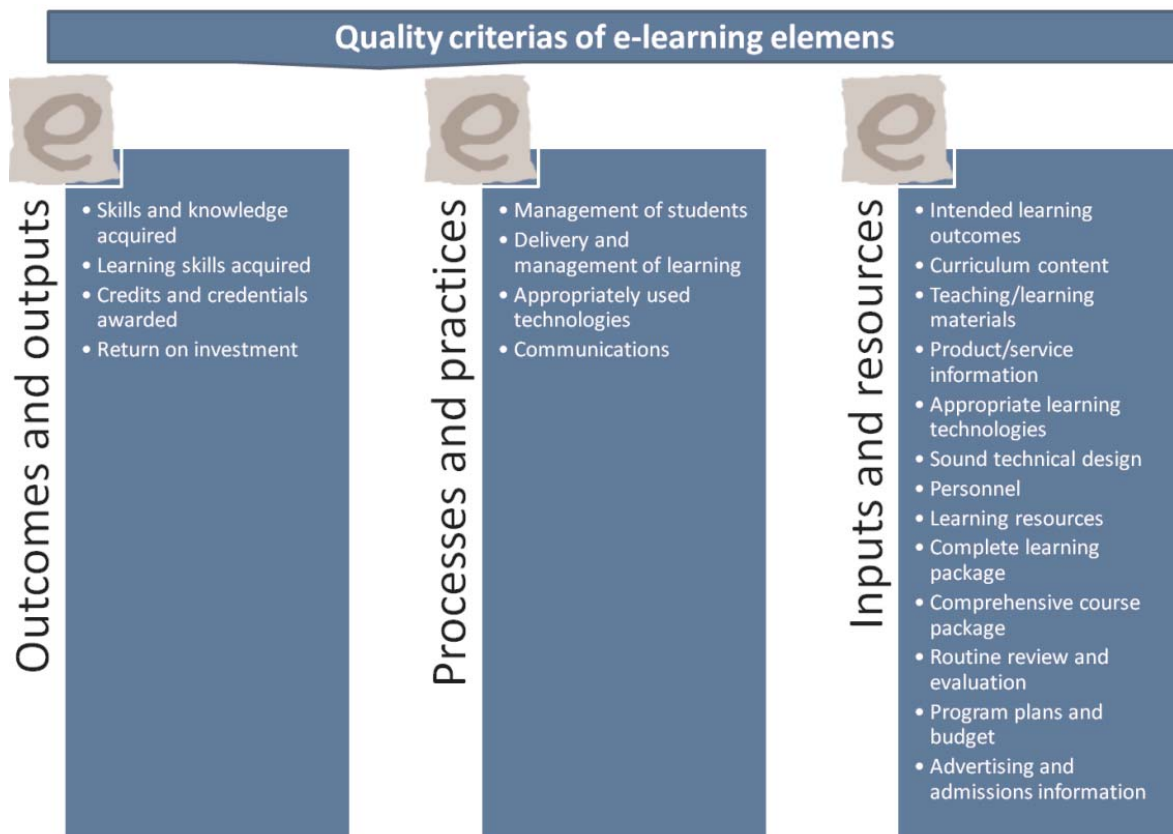
As in all learning, attention in e-learning soon turns to questions about quality. Deepwell (2007) lists that quality in e-learning can refer to teacher expectations, sophistication, purposefulness or student satisfaction but usually centers on the product. "*A predominant focus in discussions of quality in e-learning centres on the product of e-learning, such as a course, a tool, or even a new mode of delivery. There is a tendency to regard the product in isolation from the systems, processes, and culture surrounding its implementation and consequently pay little attention to the requirements and responsibilities of a wider group of stakeholders than the course or product development team, tutors, and students. A distinctive feature of e-learning is, however, its dependence on institutional infrastructure and access to technologies beyond the control of the tutor.*" (Deepwell, 2007). Deepwell (2007) emphasizes that the responsibility of e-learning quality lies at the hands of the whole organization and not merely the teacher/student. New ways on learning challenge organizational strategies and resources in addition to the teacher.

The domains to be addressed when evaluating e-learning quality:

Pedagogical	Technological	Cultural	Organizational
Disciplinary and interdisciplinary cultures	IT support	Language	Rules and procedures
Teaching, learning, and assessment regimes	Access (on and off site)	Visions	Policies and strategies
Educational development practices	Virtual learning environments,	Resistances	Reward structures
Profile of students	Software availability and expertise	Personalities	Resources
Instructions	Licensing conditions	Communities of practice	Quality assurance and enhancement agendas
Course design	Delivery	Change agency	Commitment
	Devices	Feedback	Student services
			Regulations & laws

(adapted from Cousin et al., 2004 in Deepwell, 2007; Frydenberg, 2002)

Barker (2007) expands on this by presenting a check-list for e-learning:

Quality criterias of e-learning elemens

Outcomes and outputs
- Skills and knowledge acquired
- Learning skills acquired
- Credits and credentials awarded
- Return on investment

Processes and practices
- Management of students
- Delivery and management of learning
- Appropriately used technologies
- Communications

Inputs and resources
- Intended learning outcomes
- Curriculum content
- Teaching/learning materials
- Product/service information
- Appropriate learning technologies
- Sound technical design
- Personnel
- Learning resources
- Complete learning package
- Comprehensive course package
- Routine review and evaluation
- Program plans and budget
- Advertising and admissions information

Since computer systems underlie a tendency of growing complexity (Jantke et al., 2004) attention is needed on the quality and usability of e-learning. Ehlers (2007) argues that "*quality development is a co-production between learners and their learning environment*". He clarifies that educational processes must be developed through participation. Externally steered quality strategies may influence professionalism of the process but not e-learning quality.

E-learning has been criticized for inappropriate use of technology for learning: posting material online does not make it e-learning. E-learning also requires pedagogical attention to responsive and creative learning (See Ladyshewsky, 2004). Some (Alexander & McKenzie, 1998 in Gunasekaran et al., 2002) even predict the failure of e-learning due to being overly ambitious, focusing too much on technology, reviewing irrelevant outcomes and failing to prepare students. Maloney (2007) criticizes e-learning tools for focusing on delivering content rather than teaching students to think. He also notes that e-learning tools tend to be based on out-dated thinking (focus on courses and not students) and old technology.

The challenges with implementing e-learning may rise from inadequate hardware, learner isolation, insufficient support, learner/trainer IT-skills or the ability to judge quality (see Sambrook, 2003). E-learning has also been criticized for unreliable computer systems, time management (distractions) and poor quality (amateurish content), costly set-up and expensive hardware (see Harun, 2002).

For successful e-learning:

1. Engage content and technology experts in the process.
2. Plan the course in detail: what devices is the course designed to work on?
3. Prepare both online and offline content.
4. Provide the students with tutors and technical support.
5. Make sure all backup systems are functioning.
6. Attain proper software licenses and double-check copyrights of content
7. Make the content interesting:
    - ensure you have enough pictures compared to the amount of text
    - create blogs,
    - invest in collaborative tools: chat rooms, discussion forums, social media etc.
    - utilize e-books, articles, documents, links, cases, lectures, video, audio, presentations
8. Pay attention to user-friendliness:
    - search-functions, save-options, downloading file size, clarity of presentation etc.
9. Create a FAQ (a list of frequently asked questions) and instructions (how to contact instructors etc.)
10. Update content regularly
11. Mix different elements for a purposeful whole: lectures, online material, downloadable material, face-to-face meetings, teleconferences, videoconferences, tutorials, online practices, assignments, video cases etc.
12. Test both course content and technology functioning.
13. Collect feedback.

4. Rural areas

Rural areas cover a fifth of the EU area and fourth of the population lives in rural settings (EU, 2003). These areas are faced with problems such as cost competition, outmigration, an ageing population, dispersed settlements, lack of proximity services and employment opportunities (Farrell & Lukesch, 1998). The viability of rural areas requires economic diversification into the information society and a focus on rural strengths: a healthy environment, products of high quality, space for activities and cultural traditions. The notion of distance has considerably changed due to new telecommunication technologies (see Farrell & Lukesch, 1998) and due to e-learning, rural people may have better access to learning since they no longer need to travel great distances to find quality education opportunities.

E-learning in rural areas[4]

The e-ruralnet partneriat collected information of rural e-learning through provider interviews. Many organizations stated that they do not have products specifically designed for rural areas but at the same time felt that their products could be used the same in rural and urban areas.
The challenges associated with rural e-learning were poor internet connection, geographical distance to tutors and technical assistance, and the price of broadband. The providers also noted that ICT is becoming increasingly complex and in addition to finance issued related to the internet-connection, updating user technology and software can become barriers to rural e-learning. Even semi-rural close to urban centers experienced problems with ICT infrastructure. Some institutions feared that the gap between urban and rural areas would increase instead of the progressing to a more equal direction.

There was optimism regarding e-learning with the education providers. According to one interviewee, the recipe for promoting e-learning in rural areas is to fix the technology and provide content and interaction.

E-learning must naturally bring additional value to the learning process. Access to learning for rural residents can be a significant argument for e-learning in areas where distances to educational institutions are long and the population is sparse. E-learning is also argued to benefit adults by providing flexibility, self-pacing, convenience and compatibility with family obligations. (Moore & Kearsley, 1996 in Yukselturk & Bulut, 2007). The challenges posed for citizens by rural locations compared to urban locations are lack of funding (smaller taxation base in sparsely populated areas), transportation difficulties, distance from markets and lack of access to education and a shift in the population dynamics (Mason & Rennie, 2004).

One of the challenges with e-learning in rural areas is the dominating status of the English language (see Kam et al., 2008) which is not the native language for many learners. Many tools are designed with English user interfaces and English language content dominates the Internet. This may pose an obstacle to some adult learners in rural areas. Depending on their mother tongue, learners in different areas of Europe may have access to very diverse material.

Internet is increasingly becoming the channel for government to diffuse information (Sandberg et al., 2004). If rural areas are not properly addressed in the development, it may cause regional inequalities for citizens. If rural locations are secured access to broadband, the development may be very positive. For example, medical consultation provided via broadband connections could decrease the trouble of

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4 http://www.prismanet.gr/eruralnet/en/alternative_media.php

travelling for the rural customers and also the costs for the service providers (see Sandberg et al., 2004) The major challenge for rural areas is Internet connectivity. Even though ICT is supposed to lower the barriers for learning for rural areas, the communications services provided for sparsely inhabited areas create an inequality between urban and rural citizens. Sandberg et al. (2004) point out that the new digital knowledge era means less speed, quality and capacity of Internet access for rural areas. These disparities affect both rural economies and the quality of life of rural citizens since advance digital communication is the norm these days. Mason & Rennie (2004) state that broadband is essential for rural e-learning since it is fast, reliable and "always on". They also note that although e-learning is typically not the primary reason for setting up an internet connection, it can benefit from people getting internet for entertainment, communications and shopping. Broadband also disrupts other family members less than slower dial-up connections since it enables multiple users to efficiently use the connection simultaneously.

However, Payne (2007) argues that not all people living in rural areas enjoy or suffer from the rural lifestyle. There are ICT-affluent, well-educated rural citizens and also those who have regular access to urban infrastructure. Many people commute from rural to urban areas regularly and don't suffer from being cut off from Internet infrastructure. But then there are of course also those rural citizens who are dependent on their surroundings and have fewer possibilities for travelling, securing fast Internet access and finding suitable educational opportunities. Most rural citizens in developed countries these days are not employed in land-based industries and the training needs of the rural employees are very diverse. The informal side of e-learning is as important as the formal one as people also learn from leisure interests, their peers and random material (Mason & Rennie, 2004).

5.   Alternative media

Alternative media by definition are media that alter from mainstream. These can be traditional media with new content, new looks or new target audiences: newspapers, radio, television, movies, Internet etc. Atton (2002) states that alternative media provide people usually outside media production the opportunity for democratic communication.

Alternative media refers to power in relation to the commercial mass-media but it can also be understood as an alternative mode or production or distribution. In e-learning alternative media can be used to refer to tools and devices that facilitate e-learning via different technology. E-learning means learning using ICT and alternative media in ICT are usually devices other than personal computers.

Stand-alone

Unreliable internet connections can easily cause user frustration and undermine learning efficiency (Thampuran et al., 2001). This is where stand-alone media comes in handy. The weak point with non-online media is that it does not facilitate two-direction interaction. The strength in return is its repeatability. Learning material once stored can be copied, distributed and used again and again. On the other hand, the stored material can be costly and time-consuming to update, especially in the case of resource-consuming productions such as videos and games.

Computers can be used offline to view CD and DVD content, listen to audio material, view presentations, write and calculate etc.

Video cassettes and DVD's can be used to display prerecorded training content to learners at the class room or learning from a distance. Video content can present a recorded lecture and material such as graphs but it can also be a scripted show designed for learning. Also entertainment videos can be used for educational purposes: foreign TV shows often display foreign cultures and may be used for language learning as well. The strength of DVDs is their high quality image and audio, which is unstable and time-consuming as well as potentially expensive to transmit online. Web-linked DVDs enable some material to be updated. Stand-alone videos also be viewed multiple times at the learners best convenience and in a platitude of places such as during travelling (train, plane) or in one's own bed.

Digital Study Hall[5]

Many areas in rural India suffer from a lack of qualified teachers. The Digital Study Hall project has created a feasible cost solution to this problem.

In the Digital Study Hall lectures are recorded on video and physically distributed to rural schools. These schools typically lack professional teachers and Internet connections. The video lectures are played to classroom students while a mediator is present to answer questions and facilitate discussion. This way the knowledge of experts is efficiently disseminated to rural areas via a cost-efficient digital format.

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[5]   http://dsh.cs.washington.edu/

Audio material is extensively used in language training. Audio storage formats (**CDs, mp3-players**) are relevantly cheap, user-friendly and cost-efficient. Audio content is easy to transport and listen to anywhere but the lack of visual content usually requires some kind of support material to be used such as documents, books or notes. Audio training material also needs to be carefully designed to make the structure easy to follow for users. Electronic books may also be in audio format enabling people to learn while engaged in other tasks such as driving or sports.

E-books are becoming increasingly popular with portable reading devices designed particularly for e-books. Also contemporary media content such as newspapers and magazines can be read with e-book readers. E-books enable linking, nonlinearity, data density, customizability (text size, audio option), easy distribution, low costs, search ability and multimedia features (Shiratuddin, Hassan, & Landoni, 2003 in Buzzetto-More et al., 2007). What makes e-books attractive for e-learning is their ability to carry enormous amounts of text and images and still be easily updated and taken to remote locations. Modern e-book readers are also easy to carry anywhere and are more convenient to use for reading even at home than a laptop. Although people used to print material tend to print also electronic texts, large amounts of print-outs can be tedious to carry and much more user-friendly to bring along in electronic format. Advanced e-book readers also facilitate highlighting, which is one learning technique often adopted by students learning from a text. The barriers to e-book use include battery life, price and lack of functionality of readers (Wilson, 2003 in Buzzetto-More et al., 2007).

Flexbooks[6,7]

Flexbooks are a new model of textbook creation. Through the electronic Flexbooks tools teachers and students can create custom textbooks and use open source information as content. While traditional textbooks are expensive and quickly out-dated, flexbooks can offer high quality content by top experts specifically designed for the target group's needs and context. Teachers and parents and already involved in updating the information found in old textbooks and adding more relevant information. Flexbooks support publishing this content in a visually pleasant manner with the rest of the content. Flexbooks are also expected to support collaborative learning via a community of authors, publishers and commentators. The format of flexbook creation essentially combines e-learning (editing content) and traditional learning (books and face-to-face contact).

Games (video games, portable games, computer games) can also be used offline. They are discussed in detail under the chapter "Serious games".

Online

The strength of online e-learning is that is allows all parties to participate in knowledge production. Network connections offer learners access to multimedia, skill assessments, support materials and online communication (see Gunasekaran et al., 2002). Many online tools are the same as the ones used in stand-alone devices but an internet connection enables updated content and real-time communication. The challenges with online content often arise from bandwidth which should be broad enough to permit streaming video and such.

Web-based learning requires sufficient effort: time to develop appropriate courses and learn the technology, resources for training and attention to monitoring online learning (see Williams et al., 2005).

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[6] http://www.wikinomics.com/blog/index.php/2008/02/14/flexbooks-a-wikinomics-approach-to-education/
[7] http://www.ck12.org/flexr/

Wireless mobile devices provide users with the same functions as computers but they are more convenient to carry, cheaper to buy and their battery-life is longer (Cochrane, 2006). The bandwidth of the internet connection may provide some limitations to feasible content even for individuals with some sort of connection.

RockWay[8]

RockWay is an internet service that provides users with clear, high-quality music lessons. Professional music teachers in many areas are fully booked and it is difficult to find lesson times that suit both the student and the teacher. In addition, there are many musical instruments where the nearest professional teacher is hundreds of kilometers away. RockWay enables people to learn playing music within their own home, place of work or school. There are already over a thousand lessons from dozens of teachers and the variety is constantly increasing. The lessons include all you need to know to play an instrument: the instruction levels vary from 1 to 3 (from the very basics to more advanced techniques). There are plenty of free lessons in addition to the ones that require payment.

Web 2.0.

Web 2.0 refers to the social character of Internet-usage these days. Internet is not merely a source of information but a place to meet people and share life. The merits of internet are freedom and low cost (see Brown & Adler, 2008). Social software facilitates personal sharing, individual publishing and consumer-based production of content. Brown & Adler (2008) describe that attention has shifted from access to information toward access to people. People participating in producing content are no longer required to know programming languages but are able to use Web2.0 applications to contribute opinions of their own as well as share knowledge and ideas. Web 2.0 is accessible for all due to affordability, usability and new devices (see Ebner et al., 2007). Rollett et al. (2007) summarize Web 2.0 to be defined by a large number of small communities; a focus on high-quality content rather than an elaborate interface; users adding value by creating content; network effects (the number of users make up the value of a service); new user rights; beta versions of tools; cooperation and device-independent software.

The buzz behind social software stems from the social construction of knowledge: understanding is formed through interaction with others (see Brown & Adler, 2008) and internet now enables convenient collaboration and thus, "social learning". The internet is full of online communities of practice that foster becoming a participant in a community of specialists of a field.

Web 2.0 applications include **blogs, wikis, social networks, podcasts, online office software, tagging systems** etc. Devices are also being designed with Web 2.0 requirements in mind: people have direct access to MySpace, Facebook and WindowsLive from their mobiles as well as the opportunity to SMS tweets and upload images to Flickr. Popular Web 2.0 applications include MySpace, Facebook, YouTube, Flickr and Twitter just to mention a few.

Maloney (2007) offers Web 2.0 applications as one solution to the missing innovativeness of former e-learning. It changes how we process information. Web 2.0 allows users to connect information and share the new knowledge relationships with other users. Maloney (2007) also points out that students

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[8] http://www.rockway.fi/

are obviously willing to invest time and energy in building relationships around common interests. Web 2.0 facilitates enormous amounts of informal learning.

In the learning context, Ebner et al. (2007) note that ease of use is the key to successful Web 2.0 learning applications. They also argue that while current hardware is adapted for e-learning needs, usable interfaces are not. Learning in Web 2.0 still relies to cognitive processes of the learner but the new social e-learning context facilitates taking advantage of the social process of learning. Learners can interact with each other in addition to the teacher, the technology and the content (see Ebner et al., 2007). Ebner et al. (2007) recommend that the following things are paid attention to when designing Web 2.0 e-learning: community feeling (seeing other users), search functions, data collection (links according to popularity) and ease of use.

Yang (2007) unfolds the secrets of VLC's. The internet is full of virtual learning communities (VLC) that facilitate collaborative e-learning. The challenge with them is finding quality knowledge and trustworthy partners. Trust can refer to many things: infrastructure (software, hardware), understanding, and policy (rules). VLC's host both explicit (visible, readily available) and implicit content (available via networking).

ZigZag[9]

BBC runs a web-site and online courses for journalists in countries where freedom of expression and press are not a given (Iran, Afghanistan). In the interactive virtual newsroom, novice journalists can participate in day-to-day activities of an actual newsroom and learn from experiences colleagues.

Blogs are popular in Iran but due to the governmental system, objectivity is not emphasized in national training. The BBC World Service Trust's aim is to "softly" train journalists about western models of thinking rather than change the world overnight. The covered issues are non-sensitive and educative rather than highly debated and political. But having said that, ZigZag does promote open dialogue and interaction on the forum where articles are actively discussed and commented on. In addition to the online newsroom and forum, zigzag has a radio component.

ZigZag is blocked in Iran and the only way to deliver information in through e-learning to those students who can bypass control with a VPN connection or such. There is still the issue of possible danger to the trainees for being associated with ZigZag. In Glaser's (2007) article about ZigZag, a commentor says that students can only be accessed online because face-to-face training is not possible at all. Originally BBC tried to keep the program under the radar but the widespread blogger attention and huge demand for the training slots, ZigZag was noticed by the Iranian authorities.

According to BBC World Trust, ZigZagMag is set to run until July 2011.

Wikis are websites that users can edit. Ruth & Houghton (2009) argue that wikis foster egalitarian learning and enable challenging, collaborative learning. Wikis facilitate the joint construction of knowledge and allow editor-learners to understand the issues at a deeper level. Creating wikis forces students to think about the linkages of the subject content with other areas on knowledge. In addition to fostering building complex mental constructs, participating in wikis lets learners see how their peers see the subject at hand. Wikis are also useful in learning as databanks: the collective accumulation of knowledge is

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[9] http://www.bbc.co.uk/worldservice/trust/whatwedo/where/middleeast/iran/2008/03/080222_iran_zigzag_project_overview.shtml

apparent in wikis created over time by multiple users. Wikis are about more than delivering information: they utilize the Internet context to co-construct knowledge. Advanced wikis enable editing history to be viewed so that the knowledge creation process becomes visible. The philosophy of wikis also includes that everyone can criticize entered information and that all editors are responsible (as in ready to defend) for content they contributed: authority is shared. This way the learning rests with the learner. Wikis around a certain topic can be viewed as electronic communities of practice: "Wikis blur the definition of both novice and expert as expertise is developed and constructed as part of the process" (Ruth & Houghton, 2009). Ruth & Houghton (2009) point out that wikis disrupt power hierarchies. In wikis there is less risk that prominent contributors' views gain disproportionate weight due to their social status (like in some social applications). Wikis are designed to increase collaboration instead of competition.

PodCasts are audio/video clips stored in digital format and shared over the web (typically via RSS/ Really Simple Syndication protocol). Regarding education[10], there are teaching podcasts that discuss learning challenges, subject content podcasts that deal with a certain subject topic and exercise podcasts that facilitate certain training (i.e. languages, music, arts). Podcasting software allows users/listeners/learners to subscribe to podcasts transmissions and the software automatically downloads the latest podcasts (re-cordings) for listening on the users own audio device (often mp3-player). Audio podcasts include sound whereas enhanced podcasts can also have images and chapter markers. Video podcasts are in movie format. The strength of podcasts in education is convenience: podcasts are easy to listen to anywhere, anytime without advanced technical know-how (Cebeci & Tekdal, 2006). Numerous learners of all ages already carry audio players (mp3-players, PDAs, minilaptops, cell phones etc.) with them everywhere so the devices for consuming audio e-learning are already at hand. Many learners also prefer listening to reading and thus audio material is more pleasant for them. E-learning in podcasts can be mixed with en-tertainment content so that listening remains interesting. Learners can also create podcasts of their own with audio recording devices. Many portable audio devices are also equipped with recording functions. When creating an educational podcast, attention should be paid especially to the quality and structure of the material. The tempo and tone of speech should be enjoyable to listen to and the clips should be short enough to retain attention (compare to radio). The file length should also be kept optimal for portable devices. Portable audio devices can also be used for portable access (to updated content), field recording (study projects, interview, data collection), learning support (repetition, recording feedback and discussions) and content storage.

Blogs are online diaries or personal/communal publishing forums. Bloggers can post text, pictures, link and videos to their blogs which they are expected to update regularly. Readers in turn can comment on posts. Blogs are web-based communications tools which usually quite easy to create with blog applica-tions designed to host personal blogs. Numerous blog search sites also help readers find blogs catering to their interests. Blogs can reach a wide audience through tagging and linking. In education, blogs can be used as learning portfolios that allow learners to reflect on their opinions by the comments from other students. Blogs are especially successful in promoting discussions. (See Williams & Jabobs, 2004)

Mobile phones:

M-learning refers to mobile learning i.e. learning that takes place via portable, electronic devices. Mobile devices enable people to learn wherever they are and also employees to access information when they need it.

Traditional telephones are typically used for one-on-one communication which demands time and commitment from the instructor but can be useful for the learner receiving full attention and being able to clarify all unclear issues at once. Telephones can also be used for teleconferencing which allows many people to join in an audio discussion. Mobile phones these days have multiple features apart from merely transmitting voice although they can be used for teleconferencing or one-to-one communication as well. Mobile learning takes the flexibility of online learning one step further than desktop computers: learning can truly be done anywhere and all spare time can be taken advantage of. The number of mobile phones already exceeds the number of personal computers (Attewell, 2005) and many experts estimate that mobile devices will bypass computers as the devices for electronic communication, internet access and work. Mobile phones already have many of the functions that computers do providing users with text/picture/video editing applications, calculators, audio content and access to internet materials. In learning, mobile devices facilitate wireless transfer of data and host multiple possibilities for social interaction. M-learning provides an opportunity to maximize the benefits of e-learning and optimize the interaction elements of training. M-learning also extends the target group of learners to those who are constantly moving (Brown, 2003): these are people not just away from the training institutions but in new locations all the time. M-learning also enables learners to access information at the precise moments they need it. Devices designed for mobile use are also much more convenient to carry along than laptops not optimized for convenient size and weight.

Whereas traditional telephones were used to talk and basic mobiles to talk and SMS (send short messages), mobile phones these days are used for diverse time management and communication functions. Mobiles devices are also better equipped to transmit audio than computers and they deliver synchronous audio more easily and less expensively than online technologies (Brown, 2003). QWERTY-keyboards facilitate fast typing. Mobile learning develops the learners' technology skills in addition to the content knowledge. Although mobile devices can often present the same content as laptops, the smaller screen and keyboard pose significant challenges for pleasant use. In addition to the challenges of image resizing, the connection speed and processing capabilities of m-devices can become usability problems. (see Trifonova & Ronchetti, 2003).

M-learning research focuses on **PDA**s (Personal digital assistant aka Palmtop computer) that are mobile phones[11] that manage digital information. PDAs can often be used for connecting to the internet although tools such as calculators, books, organizers and word processors can also be loaded on the PDA. The key feature of PDAs is that they are effortless to take anywhere and thus learning is no longer tied to heavy equipment that needs to be packed and moved from place to place. PDAs enable learners to both interact and access content (Trifonova & Ronchetti, 2003). Smørdal & Gregory (2002) regard PDAs as "gateways in complicated webs of interdependent technical and social networks" rather than digital assistants since they are mostly used for various communication purposes. Smørdal & Gregory (2002) found out that students using a PDA in learning had difficulty in working across different applications (copy-paste) which limits the use of the PDA compared to other digital devices or traditional material.

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[11] not all PDAs have a phone-function

Mobile phones can be used to access online learning resources such as web-links, help guides, forums and downloadable material. According to Attewell (2005) mobile learning fosters both independent and collaborative learning. It helps learners improve their literacy, identify areas where they need support and raise their self-esteem and self confidence. He continues to state that mobile learning can diminish the formality of learning and combat ICT resistance. In Peters' (2007) paper, education providers say that mobile phones are mostly used to SMS students reminders and attendance notifications. The providers also note that m-learning is ideally suited for adult learners since it allows a much quicker response than even e-mail.

There are still many areas where bandwidth is still not reliable or advanced enough to support online learning and standalone e-learning materials are more convenient for learners. Trifonova & Ronchetti (2003) label different online status modes as "pure connection" (always online), "pure mobility" (no connection) and a mixture of these two. In addition to disconnection issues, the price of online access can form a barrier to online use and learners may prefer to use the mobile device in offline mode. M-learning should take this into account be providing also offline content to be downloaded in the learners' mobile device. Caching and synchronizing in general are problematic with all mobile devices (Trifonova & Ronchetti, 2003). One solution for this is separating the data into small, downloadable packages for using offline.

Trifonova & Ronchetti (2003) recommend that m-learning courses be in short modules so the learners can take advantage of the time fragments they have while on-the-go. They also promote simple and fun m-learning modules to nurture engagement. M-learning should be possible without reading a users' guide and should take into account the fact that people use it in a very different context from traditional distance learning.

The challenge with mobile devices in learning is that the applications often need to be programmed for the particular operating system which implies costs for either the provider (taking into consideration all possible systems the learners use) or the learners (having to buy particular technology). Applications designed for PC's aren't directly convertible into a mobile format without consideration to how the mobile setting affects usability. Mobile devices can be complex even for experienced users and tutor support is often required in efficient mobile learning.

Mobile devices in some areas are expected to become the primary devices for accessing the Internet and the learning content it provides. The challenges are screen sizes, keyboard size (affecting text input speed), amount of memory, battery life, applications designed specifically for portable devices, displaying multimedia and prices.

Implementing mobile learning

1. Design short modules that the learners can use on their idle time from other tasks.
2. Make the experience fun and simple since mobile devices are not well designed for complex content.
3. With online applications, make sure how data is stored in case the connection to the user is lost.
4. With offline content, package it into small, easily downloadable parts.
5. Provide downloadable content that can be easily saved on a portable device.
6. Make sure the file sizes are reasonable and thus affordable.

6. Serious Games & Simulations

Serious games are used for other than entertainment, in the educational context for learning. Serious games can be fun but they are primarily used to teach certain content. They provide learners an opportunity to practice skills needed in the real world (Chen & Michael, 2005). Serious games can have the power to engage the modern game-acquainted generations in self-motivated learning. Learning by doing has been proven to be an efficient method of teaching and electronic games force learners to participate in the learning process. Electronic games support the development of strategic thinking, planning, communication, collaboration and negotiating (Susi et al., 2007). Gamers also have an understanding of risk versus reward, tradeoffs and risk measurement as well as experience with multitasking and complex analysis (Susi et al., 2007).

Also games designed for other than educational purposes can have a learning effect. In modern video games, players learn how to play the game, learn to use controls, learn to navigate in 3D-worlds, learn to work as teams and can even acquire practice in music (RockBand) and physical skills (WiiFit). Good video games also have tutorials, scoring and logging/playback/observer-functions (see Chen & Michael, 2005) which facilitate learning.

Serious games focus on problem solving and learning instead of rich experiences. In addition, communication in serious games tries to reflect natural (non-perfect) communication (Susi et al., 2007). Also game design can function as a powerful tool for learning since the only way to create an educative game is to understand the phenomena being taught (see Chen & Michael, 2005).

Chen & Michael (2005) highlight the importance of evaluation in using games in education. Teachers need to have a way to verify that learning as occurred. This is necessary for student comparisons, demonstration of skills level and allowing students to move to the next level. Games already measure completion of tasks, success of missions, time required to complete a mission, number of mistakes made etc. Some games also adjust content and skill level according to player performance.

Simulations are particularly useful for teaching skills that would be dangerous or costly to practice in real life: rescue missions (firefighters), medical procedures (operations, ER prioritizations), tasks performed in extreme conditions (space missions, ocean surroundings) and military assignments. Simulations can be also used to present learners with different scenarios played out depending on the choices they make. Such simulations are convenient in teaching issues such as politics, marketing and business. Serious games are especially useful in training situations where the real world equivalent would be dangerous, expensive and time-consuming (see Susi et al., 2007).

Serious games are used in many fields. *Factories* teach employees product processes with simulation games. Simulations of the whole process help each individual understand their role in the process and how their actions affect other parts of the process. The *military* trains soldiers for various tasks with serious games. These tasks can include strategic decision making, mission training and vehicle control. *Governmental* institutions use serious games to rehearse crisis management, emergency response procedures (terrorists, diseases, floods) and ethics. Serious games can also be used in city/traffic planning, budgeting and policy formulation. *Businesses* have adopted serious games to educate their staff on people skills, job-specific skills, communication skills and strategic skills. In *healthcare* serious games are utilized on patient training in addition to staff training. Patients are instructed on healthy eating habits / self-care and trained on rehabilitative motor skills. Serious games also help with cognitive functioning (memory), therapy and biofeedback. The staff uses serious games for diagnosis and training. (See Susi et al., 2007)

Since games require the learner to proactively engage in the process, they may, at their best, teach more than passive following of a subject in class. Gee (2007 in Stoerger, 2007) replaces the concept of communities of practice with affinity spaces where the primary reason for bonding is a common interest rather than social relationships. He does this to point out that social learning should be about a common endeavor and not categorizing individuals as members or non-members of a group.

Emergency services college [12, 13]

The emergency services college started their e-learning development efforts in 2006 by creating a plan on how to integrate simulations in the curricula. They define simulations as safe teaching ensembles duplicating real-life situations. The goal of the simulations is to facilitate the creation of internal modes of conduct and response patterns for the students.

Their project runs to 2011 but they have already had positive experiences with pilot courses where they have used wireless image transfer and interactive boards to broadcast real-life situations to classrooms. In actual training sessions, the official emergency communication channels are in use. According to the experiences of the Emergency services college, using simulations in teaching has increased the interaction between students and professionals and also developed pedagogic planning in the college. Simulations and related documents are occasionally also shared online. One form of an e-learning rehearsal is implementing a real-time accident simulation with all partied involved in the rescue process. According to the Emergency Services College, all parties are more likely to attend when they can do so from their own place of work/study. Such rehearsals are also less costly to carry out than real-life rehearsals. The emergency college praises e-learning for giving access to professional instructors that are more willing to participate in evaluating simulated situations.

Serious games are compelling educational tools since games are familiar to the younger generations. There are however also adult learners who are not yet familiar with electronic games and this needs to be kept in mind when creating serious games for teaching purposes. To have the attractive features of games, serious games need to be easy to use and engaging. The difficulty level also needs to be designed in such a manner that the games are challenging but yet performable and rewarding.

The critics find that games try to make learning too trivial and steer learning away from deep understanding, reflection and thinking (see Susi et al., 2007) Games are also accused of promoting violence, causing depression/isolation/fatigue and incurring health-problems (muscle tension, headaches). The proponents of serious games in turn argue that learning need not be boring and that fun and learning are not mutually exclusive.

The advantages of serious games are that they train players' (see Susi et al., 2007 for details):

- analytical skills
- spatial skills, mental rotation capabilities
- strategic skills
- learning capabilities
- psychomotor skills
- visual selective attention, 3D perception
- teamwork
- self-monitoring

- problem recognition
- problem solving
- decision making
- memory
- social skills: collaboration, joint decision-making
- information seeking
- stress management
- processes

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[12] For more information, see Honkanen et al. 2010 and Helveranta et al., 2009
[13] http://www.pelastusopisto.fi/pelastus/home.nsf/pages/index_eng

7.   Summary

This report concisely summarizes e-learning issues in a rural context. These issues include the use of alternative technology (videos, DVDs, CDs, mp3-players, e-book readers etc.) to compensate for inadequate ICT infrastructure and e-learning as a way for rural learners to access learning communities and benefit from contemporary learning trends (web 2.0 applications, games, simulations etc.).

E-learning generates a lot of interest because it enables learning to take place anywhere and anytime. This is particularly important from the aspect of lifelong learning as adult learners often have multiple responsibilities in addition to studying and learning that is modifiable to their restricted schedules and varying locations sounds ideal. E-learning can also be cost-efficient both for the provider (repeatability) and the student (travelling costs, time from work).

Multiple check-lists and frameworks have been developed for training providers interested in e-learning. The important thing to remember is the needs of the target group. Both the technology and the content need to be of high quality but e-learning course creation need not automatically be expensive. Students have been found to value interaction, content and flexibility over technological solutions.

From the rural learner's point of view, e-learning enables studying niche fields in which other training options may be behind long geographical distances. E-learning can also provide feasible access to best practitioners of the field instead of opting for the training institution that is close by.

This in turn generates increased competition between training institutions. Contemporary training providers can't rely on the assumption that learning will continue to be in the form of classroom courses and lectures as it mainly has been for hundreds of years before the breakthrough of the information society. Contemporary workers also need the skills provided by e-learning in order to be able to compete in the job market: the ability to locate and process information, the skills related to computer and Internet use and the know-how of how to navigate within electronic social networks.

For e-learning to be a truly viable studying option in rural areas, attention should be paid to the ICT infrastructure and thus providing rural students with equal access to up-to-date information required in a knowledge economy. Although standalone applications hold their place as media to be used in peripheral locations and when travelling, the communication and information updating possibilities that Internet provides can't be ignored if all members of the EU are to be included in the contemporary knowledge community.

8. Additional resources

Terminology

E-learning / Electronic learning = Learning facilitated by ICT or content/interaction delivered by electronic media. Some definitions reduce e-learning to Internet-learning which demands an Internet-connection.

M-learning combines e-learning and mobile computing/devices.

Blended learning = a combination of e-learning and traditional, face-to-face learning. Blended learning can also refer to other combinations of learning environments. a.k.a. "Hybrid learning"

Web-based learning = Using the Internet for learning. E-learning with an online connection.

E-Lecture = Live or recorded lecture transmitted via electronic media.

SMS = Short Message Service

Lifelong learning = A process of continual development through an individual's lifespan. Lifelong learning includes formal and informal learning. Lifelong learning is also associated with social sustainability of communities, economic productivity, and innovation creation.

Learnware = E-learning software.

Computer-based training (CBT) = Courses and training using a personal computer as the primary tool.

Interactive video (IV) = Blending video and interaction.

Distance education = Learning where the learner and instructor are in a physically different place.

Digital television (D(i)TV) = Digital broadcasting of television programs. Facilitates higher quality and added functionality.

Paperless education = Storing and delivering courses in electronic format to save space, printing costs and the nature.

Wireless mobile devices = PDAs, mobile PCs/tablet PCs, notebooks, cell phones, smart phones and others.

Smartphone is a mobile phone with advances features. Smartphones include an operating system and can run more sophisticated applications than mobiles.

Tagging = a non-hierarchical keyword attached to a word, sentence or chapter

2 G = 2nd generation (2G) / Personal communication service mobiles enable data transmission

3G = 3rd generation (3G) mobiles support wireless audio and video transmissions as well as mobile internet access. The 3G system enables simultaneous transmittance of audio and data. 3G mobiles can be used for watching mobile TV and videoconferencing.

Examples of popular social and learning software

- Facebook (http://www.facebook.com/)
- Ning (http://www.ning.com/)
- Twitter (http://twitter.com/)
- MySpace (http://www.myspace.com/)
- Litefeeds (http://www.litefeeds.com/)
- Blogger (https://www.blogger.com/)
- Letmeparty (http://www.letmeparty.com/)
- Instant messengers: AIM, WindowsLive
- Skype (http://www.skype.com/)
- Elgg (http://www.elgg.org/)
- Flickr (http://www.flickr.com/)
- Meebo (http://www.meebo.com/)
- Newsgator (http://www.newsgator.com/)
- PBWorks (http://pbworks.com/)
- YouTube (http://www.youtube.com/)
- SchoolLoop (http://www.schoolloop.com/)
- IXL (http://www.ixl.com/)
- GoogleDocs (http://docs.google.com)
- Wordl (http://www.wordle.net/)
- Animoto (http://animoto.com/)
- Connexions (http://cnx.org/)
- Digg (http://digg.com/news)
- Diigo (http://www.diigo.com/)
- FriendFeed (http://friendfeed.com/)
- PhotoBucket (http://photobucket.com/)
- Technorati (http://technorati.com/)
- Mendeley (http://www.mendeley.com/)
- Posterous (https://posterous.com/)
- Socialmention (http://www.socialmention.com/)
- Reddit (http://www.reddit.com/)
- Roomatic (http://roomatic.com/)
- Seesmic (http://seesmic.com/)
- Drop.io (http://drop.io/)
- Slashdot (http://slashdot.org/)
- Stumbleupon (http://www.stumbleupon.com/)
- TweetDeck (http://www.tweetdeck.com/)
- Twibes (http://www.twibes.com/)
- Slideshare (http://www.twibes.com/)
- Amplify (http://amplify.com/)
- Wikispaces (http://www.wikispaces.com/)
- DigiTales (http://www.digi-tales.org/)
- GooleMaps (http://maps.google.com/)
- TED (http://www.ted.com/)

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