



Review of Learning in ICT-enabled Networks and Communities

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EXECUTIVE SUMMARY

Lifelong learning plays a crucial role in society today as jobs and the skills required for them are changing. Forecasts suggest that the qualification structure of jobs in Europe will have changed significantly by 2020, and the demand for qualified employees will increase. The working population needs training, as the younger generation entering the labour market will not be able to fulfil all the labour market skill needs over the next decade. Education and training systems must adapt to lifelong learning needs, companies must have dedicated strategies for dealing with lifelong learning, and learners must be empowered to take responsibility for developing their competences. There is a very real and important need for lifelong learning, which demands that learning opportunities, both inside and outside traditionally recognised formal education systems, are recognised and supported.

At the same time, the use of Information and Communication Technologies (ICT) is increasing. Especially social computing applications provide new platforms where people can connect, share and create together and become members of new networks and communities. People from all age groups are participating in different types of online collaborative activities, which can support work, learning, and citizenship. Measurements suggest that the majority of internet users are engaged with social computing applications, which are already being used more than personal email. Furthermore, online networking and collaboration is not only attracting young people – workers and older people are also becoming major users. Presumably, people are learning from each other in their interactions and in sharing their creations online as they do in local offline communities. However, there is, as yet, very little research on whether learning is taking place in these online settings and if so, whether it could be harnessed for lifelong learning systems for the benefit of individuals and the society.

This report studies the potential of these new online activities for lifelong learning as part of a larger project launched by Institute for Prospective Technological Studies (IPTS) with DG Education and Culture. The overall project studies what contributes to the emergence and success of learning in ICT-enabled communities, and how these communities could promote quality and innovation in lifelong learning and education systems in Europe. The project aims to contribute with research and policy suggestions to support the four strategic objectives of European education and training, which are to:

- make lifelong learning and learner mobility a reality;
- improve the quality and efficiency of education and training;
- promote equity, social cohesion and active citizenship;
- enhance creativity and innovation, including entrepreneurship, at all levels of education and training.

This report explores the research scope by reviewing and analysing existing research, data, and resources. It gives first suggestions regarding the potential of online communities for responding to the needs for learning new skills for new jobs.

In online collaborative settings, individual learning can take place in various ways, through exploration, discovery, experience and reflection. People can construct their understanding with personalised meaning making processes, which are guided by social interaction, cultural context and mediating tools. The social context is important for learning, as it provides the emotional, behavioural and knowledge context which allows people to develop with others as a part of the context. As no individual can retain all information, learning to collaborate with others, and belonging to networks or communities are important for lifelong learning. Technologies allow us to build and maintain connections to information and experts. Therefore, the importance of shifting from learning facts and figures to learning strategies and culture is emphasized. In the lifelong learning context, the development of interests, self-efficacy and self-regulated learning strategies are vital for supporting individual learning.

A review of online networks and communities shows that a wide variety is emerging as a result of social computing and other internet-based applications. The drivers for participation in these different

online communities also vary – from users having a joint objective (task, product), or a common interest/situation (topic, profession), to their need for social connection. These drivers can be supported in an interconnected manner in different online collaborative settings. Some online communities are driven by an organisational setup (educational institution, workplace, associations), while others connect and invite members horizontally in an open manner. The most commonly mentioned motivations for online networking were: perceived usefulness, connecting with others, and contributing to the common good. Social networking and social media sharing communities especially show high intrinsic motivations and enjoyment, relating to self-expression and sharing experiences. Though people do not often explicitly mention learning as a reason for participating in online collaborative activities, research shows that they do actually learn in these environments. When compared to traditional classroom learning situations, this study comes to the conclusion that ICT-enabled communities offer:

- different ways to learn (through discovery, participation and doing, and also through new opportunities for observing and reflection);
- different social contexts for learning (with active peer support, apprenticeship and situated learning with experts, social acknowledgement of learning, social knowledge management); and
- new ways to access and organise learning (heterarchical collaboration models, linking external networks and communities to education in new ways, enabling individual lifelong learning trajectories).

Some of these approaches have also been tried in formal and non-formal education, but they often emerge more naturally in informal online settings (e.g. learning through developing and discussing life stories and experiences in the blogosphere). Furthermore, new online networks and communities accommodate opportunities for learning through observing and following activities of others. ICT is crucial for online communities, not only as the basis for their existence, but also because it provides them with many specific affordances for learning. It offers new ways of launching reflection, experimentation, creativity, and supports social experience differently from face-to-face settings. It also provides tools for personalising learning paths and knowledge management. Additionally, ICT provides new ways to gather and follow implicit knowledge demonstrated in online activities.

Online networks and communities can facilitate learning related to all the key competences for lifelong learning (communication in the mother tongue; communication in foreign languages; mathematical competence and basic competences in science and technology; digital competence; learning to learn; social and civic competences; entrepreneurship; and cultural awareness and expression). In addition to topic-specific and transversal competences, community participation can support explicit and implicit learning of concepts, practices and attitudes for developing one's professional and private identity and life. The learning enabled by certain community settings depends on the topic, tasks and culture of that community. Many, though not all, collaborative communities are also learning on a collective level, revising their tools, resources, processes and goals according to the participants' collective understanding. Learning and development on the community level is important, as it helps the community to stay up to date with the societal context and respond to the needs of the participants. Empowering participants to affect the development of a community can improve its relevance and value as it will thus reflect the up-to-date collective knowledge of, for example, a profession, task or interest-based social group. It is suggested that success factors for individual learning in communities include: 1) perceived relevance and opportunity for participation, 2) psychological commitment to the community goals and culture, 3) a supportive environment for interaction, 4) norms, rules and (diverse) roles that facilitate community learning, and 5) self-perception and personal skills for learning. All of these factors are interrelated, and the suitability of tools and technologies for the purpose and for the user plays an important role.

Collaborative informal learning, online or offline, is not easily compatible with instructionist approaches developed for the industrial society. Currently, few links between organisations

(educational institutions, workplaces) and learning in online networks and communities seem to exist. A major challenge for learning in online communities is ensuring that people have the necessary knowledge, tools and skills to start participating in ICT-based social approaches. Furthermore, not all people are equipped with the ability or motivation for self-regulated learning. Community tools and models are important in that they allow inclusive engagement, and effective learning processes often require scaffolding and supportive assessment. This should be linked to the development of validation systems for non-formal and informal learning, which identify and make visible different relevant learning outcomes. These could guide individuals, if they want to direct their efforts to learning in informal settings.

Overall, there is a lack of awareness (among organisations and people) of the potential for learning in online networks and communities. These social contexts reflect current topics of interest among students at schools and universities, workers at the workplaces, and citizens in the society, supporting learning contemporary and relevant skills and knowledge. Educational institutions should acknowledge the important role of these informal online networks, prepare people to take part in them and learn from the emerging approaches that motivate and engage people to learn important competences for future jobs. Educational institutions could benefit from linking their approaches with online communities. Furthermore, participation in online communities could improve the students' skills and interest in lifelong learning. However, this would require new ways of thinking about objectives, management, funding and about where the borders lie between organisations and their environment. Overall, there is little literature on learning in informal online collaborative settings or on combining it with formally-certified learning objectives. Research is needed to gather evidence and suggest value propositions for institutions and the different actors and stakeholders, in order to encourage them to change their practices and support them in doing so.

This is an interim report on the project. It has aimed to shed light on aspects which are important for lifelong learning in online communities and to highlight those aspects, which should be studied further. This review already shows many examples demonstrating that ICT affords communities important pedagogical, social and organisational aspects, which can promote new ways of learning. It is suggested that:

- 1) Online communities are becoming an important element of many people's lives and have the potential to become a key tool for the desired *lifelong learning continuum*, enabling people to learn throughout their life course in order to develop relevant skills for their jobs and lives. However, educational institutions need to prepare both themselves and their learners for it;
- 2) Online communities can provide social and specific environments for different types of learning outcomes, where learning together with the experts and workers in the field can provide effectively *relevant knowledge, skills and competences*, but reaping the benefits of this requires revising learning objectives and assessment strategies in institutions;
- 3) The diversity of opportunities and ICT affordances for personalisation in online communities can support *equity and active citizenship*, after initial barriers related to access, skills and attitudes for participating in lifelong learning in online settings have been overcome. This may require specific support for some individuals;
- 4) Personalisation of learning in social environments and versatile tools for productive activities can nurture *creativity and skills for innovation*, and community approaches could enhance the *innovative capabilities* of educational institutions, if the culture and frameworks in the institutions encourage and allow these transformations to take place.

Overall, there is reason to believe that online communities can provide people with the means to learn new skills for new jobs in new ways, so long as educational systems seize the opportunity. It is important that educational institutions acknowledge and learn from these new learning approaches and environments in order to bring about their own transformation for the 21st century, becoming systems that support competence building for new jobs and personal development with a learner-centred and lifelong perspective.

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1 INTRODUCTION

Social computing has been growing very fast and, as a result, users now have various opportunities to use the Internet for collaboration and interaction instead of simply for information searches and individual activities. Recent data captured from December 2007 – December 2008 by Nielsen Online (2009) shows that two-thirds of the world's Internet population visit social networking or blogging sites. These activities account for almost 10% of all internet time, and are surpassing the time used for personal email applications. Furthermore, time spent on social network and blogging sites is growing more than three times the rate of overall Internet growth. Globally these activities already account for one in every 11 online minutes – in Brazil, even one of every four minutes and in the UK, one in every six minutes (Nielsen Online, 2009).

People from all age groups are participating in social media with content contributions and different types of online collaborations, which can support work, learning, and citizenship (Ala-Mutka, 2008). Even online social networks, which have typically been occupied by young people, have been attracting broader and older audiences. From December 2007 through to December 2008, the greatest growth in Facebook, a leading global online social networking platform, has come from people 35-49 years of age (+24.1 million) (Nielsen Online, 2009). During this time, the growth in the number of 50-64 year old visitors (+13.6 million) to Facebook was almost twice as many as the growth in the number of under 18 year old visitors (+7.3 million). Facebook has also been adapting to the requirements of the users. The platform gave in to pressure from members who protested against new rules and applications which invaded their rights and data, and has now granted members comment and voting possibilities over future policies on how the site is governed (Nielsen Online, 2009).

Online collaboration and networking is a significant phenomenon, which has enabled new ways of being part of a community. This raises the question of whether online socialisation can provide the educational aspects often connected with traditional offline communities. Do the online social interactions between people and the new opportunities provided by technologies for creating, expressing, sharing and reaching, also support learning? As individuals need lifelong learning to help them adapt to changes in job requirements, in economy and society, could online communities be harnessed to support this learning in new ways?

To explore these questions, IPTS launched a project "Innovations in New ICT-facilitated Learning Communities" with DG Education and Culture. The main research question is: What contributes to the emergence and success of learning in ICT-enabled communities, and how can these promote quality and innovation in lifelong learning and education systems in Europe? The project aimed to review and assess innovative social and pedagogical approaches to learning that are emerging in new ICT-facilitated networking settings. The main goals of the study were to provide an overview and analysis of new learning approaches and communities, investigate the contribution of ICT in enabling new collaboration models, analyse the relationship between ICT, learning and innovation, and propose avenues for further research and policy-making.

1.1 PURPOSE OF THE REPORT

This report presents the interim findings of the project. It explores the research scope, provides information and contributes to the research work that will continue in further phases of the project. The report gathers information on a broad variety of ICT-enabled networks and communities, which facilitate collaboration and have the potential to facilitate learning. However, the report does not review in-depth collaborative learning approaches inside institutional learning settings, as these have been reviewed in the parallel IPTS study on "Learning2.0: Web2.0 innovations in Education and Training" (Redecker, 2009; Ala-Mutka et al., 2009). In some cases, research relating to collaboration in educational course settings is introduced, when it is considered to have relevant messages for learning communities in general, including those that are outside structured courses.

This report will review the new emerging learning contexts, and discusses:

- What are the new ICT-enabled communities that can support lifelong learning?
- What motivates people to participate and learn in these communities?
- How do people learn in these settings and what role does ICT play in their learning?
- What competences can be learned in these settings?
- What are the factors that can support an individual's learning in communities?
- What are the challenges that could prevent people from benefiting from these new learning opportunities?

1.2 APPROACH OF THE REPORT

This report draws from a variety of sources, not only traditional books and journal articles, but also reports, statistics and online resources. Material and data for research were gathered through:

- Keyword searches with terms recognised from the relevant publications on learning in communities, with iterative approach to refining the terms. Searches have been done to major abstract and citation indexing databases such as Compendex, Eric, Inspec, SCI as well as publications portals such as ScienceDirect, IEEE Xplore, ACM Digital Library, Wiley InterScience, SpringerLink, Ed/ITLib, InformaWorld;
- Survey of the recent (last two years) issues of major relevant journals, such as British Journal of Educational Technology, Behaviour & Information Technology, Computers & Education, Internet and Higher Education, Web-based Communities, European Journal of Education, Educational Research Review;
- Survey of the recent reports and discussion papers of organisations such as Becta, Cedefop, FutureLab, OECD¹, OFCOM², European Commission;
- Survey and measurement statistics on the topics relating to ICT, internet and learning, from sources such as Eurostat, Pew/Internet, Nielsen Online;
- Following through the references of the full papers reviewed to seminal articles, resources and books which appeared to be relevant for discussing learning in ICT-facilitated communities;
- Finally, the research has benefited from suggestions from colleagues, expert reviewers, workshop participants and other IPTS research such as The Future of ICT and Learning in the Knowledge Society (Punie et al., 2006), Exploratory Research on Social Computing (Punie, 2008; Ala-Mutka, 2008; Cachia, 2008) and Web2.0 Innovations in Education and Training (Redecker, 2009; Ala-Mutka et al, 2009).

As the field is both broad and developing fast, research material was gathered more than once. After the first literature search sessions in September 2008, research material was incrementally complemented through further searches, following up links discovered from article texts under review, and general online scanning of the landscape. To give an idea of the scope of the materials studied for the report: 269 articles, 99 reports, 24 books, 33 policy papers and various online resources were at some point selected for further study, on the basis of evaluation of their abstract or other content description. After studying their full-text content, 233 were judged to be relevant to the study and were included as references in this report.

After this introductory chapter, the report is structured as follows. Chapter 2 summarises the policy background and context for this research. Chapter 3 gives an overview of theoretical approaches relating to learning in (online) communities. Chapter 4 discusses the types of online networks and communities recognised, and different drivers and motivations for people to participate in them. Chapter 5 reviews the approaches and innovations for learning in online communities, and the

¹ Organisation for Economic Co-operation and Development, <http://www.oecd.org/>

² <http://www.ofcom.org.uk/>

affordances ICT provides for them. Chapter 6 explores learning outcomes and success factors of individuals' learning in online communities, and Chapter 7 brings up the major challenges recognised. The final chapter brings together some of the main messages, as a basis for progressing towards the next steps of the project.

2 STUDY CONTEXT

In Spring 2005, the European Council relaunched the Lisbon strategy (European Commission, 2005a) calling for Europe to refocus on its priorities of growth and employment. The revised strategy aims to renew the basis of Europe's competitiveness, increase its growth potential and its productivity and strengthen social cohesion, placing the main emphasis on knowledge, innovation and optimisation of human capital. Knowledge and innovation are engines of sustainable growth. Therefore, it is important to develop research, education and all forms of innovation as they make it possible to turn knowledge into added value and create more and better jobs.

2.1 ICT AND INFORMATION SOCIETY POLICIES

Information and Communication Technologies (ICT), and related policies, play a key role in achieving the goals of the Lisbon strategy. In 2005, the new strategic framework for information society policy – i2010 – identified three policy priorities: the completion of a single European information space; strengthening innovation and investment in ICT research; and achieving an inclusive European information society (European Commission, 2005b). Education and training systems play an important role in achieving these goals. As ICT can be a driver of inclusion, better public services and quality of life, all citizens need to be equipped with the skills to benefit from and participate in the information society. Policy actions such as the Education and Training 2010 Work Programme³ and the Lifelong Learning Programme⁴ have set objectives for education and support the development of learning in the knowledge society. The Cluster working around ICT for learning under the E&T 2010 Work Programme regularly disseminates good practice as well as recommendations for further policy work.⁵ One of the focus areas of the Lifelong Learning Programme is developing innovative ICT-based content, services, pedagogies and practice in order to promote better education and training throughout a citizen's life.

The Commission Communication (2008f) on New Skills for New Jobs⁶ requires the education, training and employment policies of the Member States to focus on increasing and adapting skills and providing better learning opportunities at all levels, and to develop a workforce that is highly skilled and responsive to the needs of the economy. Education and training systems must generate new skills, to respond to the nature of the new jobs which are expected to be created, and to improve the adaptability and employability of adults already in the labour force. Providing high quality early childhood and basic education for all, improving educational attainment and preventing early school leaving are crucial to equip people with key competences, including the basic skills for learning that are pre-requisites for further updating skills.

Digital skills play a key role for learning, working and living in the information society. In its Communication on Media Literacy in the Digital Environment (European Commission 2007c), the Commission points out that, due to the increased availability of digital media products and user generated content, there is a need to empower the citizens to "actively use media, through, inter alia, interactive television, use of Internet search engines or participation in virtual communities, and better exploiting the potential of media for entertainment, access to culture, intercultural dialogue, learning and daily-life applications (for instance, through libraries, podcasts)". Digital competence is defined as the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet (European Parliament and the Council, 2006). The Communication on

³ http://ec.europa.eu/education/policies/2010/et_2010_en.html

⁴ http://ec.europa.eu/education/programmes/llp/index_en.html

⁵ See the peer learning clusters at http://ec.europa.eu/education/lifelong-learning-policy/doc32_en.htm

⁶ See also New Skills for New Jobs web site <http://ec.europa.eu/social/main.jsp?catId=568&langId=en>

eSkills (European Commission, 2007f) calls this competence "ICT user skills", and it is a precondition for ICT practitioner skills and e-business skills.

In line with the Commission's eInclusion strategy by the Riga Declaration of June 2006 (European Commission, 2006c), particular efforts are needed to make ICT accessible to groups at risk of exclusion from the knowledge-based society. The European i2010 initiative on e-Inclusion (European Commission, 2007b) emphasizes the importance of enabling conditions for everyone to take part in the information society; paying attention to broadband and internet connections, e-Accessibility of the services (European Commission, 2005c), and tackling gaps in the digital competence. Equity continues to be a challenge to most education and training systems in the EU, as less favoured family backgrounds, migrant origins and gender differences continue to affect educational achievement (European Commission, 2008a). The Commission recently opened a consultation on the issue of migration and mobility for EU education systems (European Commission, 2008d).

The European Commission (2008c) staff working paper on using ICT to support innovation and lifelong learning concludes that the impact of ICT on education and training has not yet been as great as had been expected, despite wide political and social endorsement. Although ICT has the potential to develop a "learning continuum" that would support lifelong learning in formal, informal and workplace learning contexts, this has not been realised. ICT's potential for facing the challenges for innovation and lifelong learning in the knowledge society often goes unmentioned in official communications. The Staff Working Paper emphasizes the need for policies to focus on

- i) embedding ICT-based tools in education systems for teaching and learning, and for management and administration;
- ii) enabling lifelong learning by exploiting ICT's important advantages in providing easy access to learning resources; support for personalised learning paths; and scope for innovative learning tools and resources; and
- iii) leveraging innovation and change into the core functions of education. Innovative content and services are urgently needed, because educational systems must themselves be innovative if they are to provide the necessary knowledge, skills and competences for an innovation-friendly society.

2.2 POLICIES FOR LIFELONG LEARNING

The Commission (2008g) called upon the Council to endorse an updated framework for future European cooperation in education and training, which will face four strategic challenges in the years up to 2020:⁷

- Make lifelong learning and learner mobility a reality;
- Improve the quality and efficiency of education and training;
- Promote equity, social cohesion and active citizenship;
- Enhance innovation and creativity, including entrepreneurship, at all levels of education and training.

Lifelong learning is a necessity if Europe is to meet the objectives of the revised Lisbon strategy. Enabling lifelong learning for citizens with the facilities that ICT can offer is an important way of fostering their competitiveness and employability, social inclusion, active citizenship and personal development. Lifelong learning is defined as "all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competences within a personal, civic, social and/or employment-related perspective" (European Commission, 2001). Hence, it includes formalised, non-formal and informal learning activities.

⁷ These were adopted in May 2009, see Council Conclusions for "ET 2020" at http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/educ/107622.pdf

Member states are invited to develop an efficient adult education system for lifelong learning in the Commission Communications "Adult learning: It is never too late to learn" (European Commission, 2006a) and "Action Plan on Adult learning" (European Commission, 2007a). Key messages include increasing equitable participation possibilities for adult learning, concentrating on the quality of learning approaches for adult learners, recognition of non-formal and informal learning, investments in the education of older people and migrants, and the importance of data gathering on adult learning. The Communications also bring up the need to ensure the efficiency of education and training by designing it to match the needs of the learner. Universities are encouraged to grasp more directly the challenges and opportunities presented by the lifelong learning agenda in the Commission Communication on modernising universities (European Commission, 2006b). Society is becoming increasingly knowledge-based and knowledge is replacing physical resources as the main driver of economic growth. European universities have enormous potential, but this potential is not fully harnessed or put to work effectively to underpin Europe's drive for more growth and more jobs. Among several recommendations given in the Communication, it was pointed out that universities should offer innovative curricula, teaching methods and training/retraining programmes which include broader employment-related skills along with the more discipline-specific skills.

The Commission Communication on teacher education (European Commission, 2007e) emphasizes the important role that teachers play in helping people develop their talents and fulfil their potential for personal growth and well-being, pointing to the increasing complexity of the teaching profession. Teachers should be enabled to obtain good qualifications, continue professional development throughout their careers with the help of mobility, and work in partnerships with schools, local work environments, work-based training providers and other stakeholders. It is pointed out that their initial education cannot provide teachers with the knowledge and skills necessary for a life-time of teaching. The education and professional development of every teacher needs to be seen as a lifelong task, and be structured and resourced accordingly. Schemes for induction, mentoring by experienced professionals and systematic training and development schemes in the institutions would support this.

The foundations for lifelong learning are laid during the initial education and training which has to provide all citizens with the key competences that prepare them for life in a modern world and set them on the path to lifetime learning. The Communication that addresses how schools can improve key competencies (European Commission, 2008e) emphasizes the need to prepare pupils for the 21st century. The European Framework for Key Competences for Lifelong Learning (European Parliament and the Council, 2006) identifies and defines, for the first time at the European level, the key competences that citizens require for their personal fulfilment, social inclusion, active citizenship and employability in a knowledge-based society:

- Communication in the mother tongue
- Communication in foreign languages
- Mathematical competence and basic competences in science and technology
- Digital competence
- Social and civic competences
- Sense of initiative and entrepreneurship
- Cultural awareness and expression
- Learning to learn

These key competences do not only include the 'traditional' competences, but also transversal ones such as learning to learn, social and civic competences, sense of initiative and entrepreneurship, and cultural awareness and expression. Many of the key competences overlap and interlock. Many themes are applied throughout the Framework: critical thinking, creativity, initiative taking, problem solving, risk assessment, decision taking and managing feelings constructively play a major role in all eight key competences. The year 2009 has been named as the European Year of Creativity and Innovation (European Commission, 2008b), for emphasizing creativity, through lifelong learning, as a driver for

innovation and as a key factor in the development of personal, occupational, entrepreneurial and social competences and the well-being of all individuals in society.

In April 2008, the European Parliament and the Council (2008) adopted a common European reference framework (European Qualifications Framework, EQF) in order to support citizens' mobility between countries and to facilitate their lifelong learning. Member states are recommended to use it as a reference tool to compare the qualification levels of different qualification systems, and to relate the national systems to EQF by 2010. The EQF provides a framework for specifying requirements for learning outcomes on different levels: knowledge (theoretical or factual), skills (cognitive and practical), and competence (responsibility and autonomy). By establishing a common reference point, the EQF can indicate how learning outcomes may be combined from different settings, reducing barriers between different education providers. Furthermore, the EQF can support individuals by facilitating validation of non-formal and informal learning, as it focuses on learning outcomes instead of the formal learning provider.

2.3 ELEMENTS OF LIFELONG LEARNING

Policy documents reflect the same message as the research literature: in contemporary society, lifelong learning is a necessity for everyone. Learning can no longer be dichotomised into a place and time to acquire knowledge (school) and a place and time to apply knowledge (the workplace) (Gardner, 1991 cited in Fischer & Sugimoto, 2006). People are flooded with vast amounts of available information – much more than any one individual can handle and retain. People need skills for solving ill-structured and complex problems, and they need to learn to benefit from collaborating with other people in these tasks (Spector, 2008). Lifelong learning should promote effective educational opportunities in the many learning settings through which people pass, including home, school, work, and society. It is not a system for adult education or training but a mindset for individuals that is needed (Fischer & Sugimoto, 2006).

Different types of learning are often categorised as formal, non-formal and informal:⁸

- Formal learning is typically provided by an education or training institution. It is structured (in terms of learning objectives, learning time or learning support) and leads to certification. Formal learning is intentional from the learner's perspective.
- Non-formal learning is provided by any organised, structured and sustained educational activity. It may take place both inside and outside educational institutions and caters for people of all ages. Non-formal learning is intentional from the learner's perspective, but typically does not lead to certification.
- Informal learning results from daily life activities related to work, family or leisure. It is not structured (in terms of learning objectives, learning time or learning support) and typically does not lead to certification. Informal learning may be intentional, but in most cases it is unintentional (or "incidental"/random).

The term 'lifewide learning' is sometimes used to illustrate the versatility of learning situations in all aspects of life, not only during different life phases. Figure 1 demonstrates how these different types of learning might occur for an individual citizen (and learner) in different phases of his/her life. Formal education is concentrated in the first parts of the life span, but people may return to school or universities to get additional degrees or to update their qualifications. Non-formal training can be participated for hobbies, interests and work-related skills throughout life, and is organised by different organisations and trainers. Informal learning takes place all the time, throughout life, with many small learning incidents taking place in parallel.

⁸ These definitions are elaborations based on European Commission (2001) and ISCED97 Glossary at http://www.uis.unesco.org/TEMPLATE/pdf/isced/ISCED_A.pdf

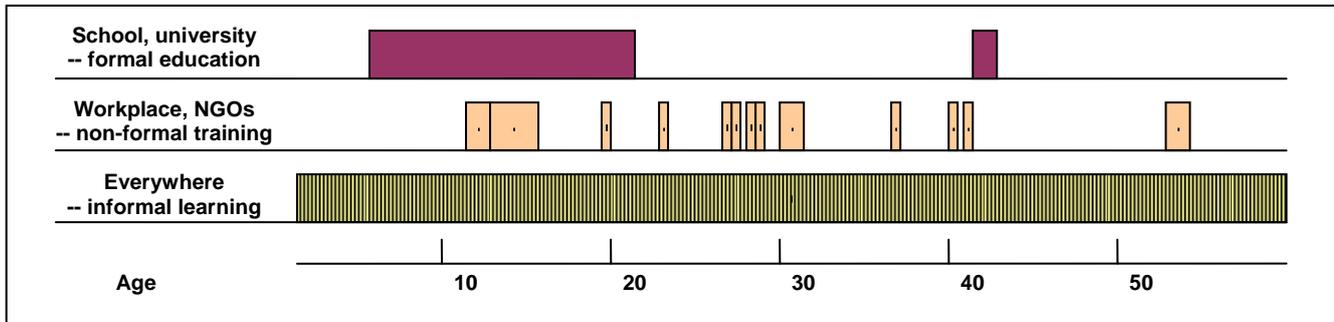


Figure 1 : Possible phases of formal, non-formal and informal learning in the life course of an individual

A learner-centred approach is vital for supporting learning in the different settings. Lifelong learning should be a continuous engagement in acquiring and applying knowledge and skills in the context of self-directed learning activities (Fischer & Sugimoto, 2006). Fischer and Sugimoto gather the following objectives for an approach of this kind to lifelong learning:

- Learning should take place in the context of authentic, complex problems (because learners will refuse to quietly listen to someone else's answers to someone else's questions);
- Learning should be embedded in the pursuit of intrinsically rewarding activities;
- Learning can take place without teaching. Informal learning activities are equally important for lifelong learning and also for formal learning paths;
- Learning-on-demand needs to be supported because change is inevitable, complete coverage is impossible, and obsolescence is unavoidable;
- Organisational and collaborative learning must be supported because the individual human mind is limited;
- Skills and processes that support learning as a lifetime habit must be developed.

In addition to different learning situations, Eneroth (2008) suggests that it is also important to consider the different types of knowledge that arise from different learning settings. This relates also to the concepts of tacit and explicit knowledge, and its transformation (Nonaka et al., 2000). The following points synthesise these aspects:

- Formal knowledge is knowledge of something, and it is possible to separate this knowledge from that 'something' with a certain permanence and general applicability. It is explicit knowledge, which is possible to formulate in words, and transmit through media for other people.
- Non-formal knowledge is individual knowledge coming from individual learning situations, and depends on the context, resources and background. This knowledge may be formed by internalising explicit knowledge with an individual perspective. It is an individual's consistent sense-making of the world in different circumstances.
- Informal knowledge is not easily described in words. It is the skill to know what to do in particular circumstances and how to do it. It is often tacit knowledge which builds up through experience in casual and accidental incidents and social situations, where the individual incidentally and unintentionally learns to handle more and more of these incidents and situations.

Considering the different types of knowledge and skills, which can be acquired in various learning situations, highlights that approaches developed for formal education cannot be applied to all learning. Non-formal knowledge may require separate articulation processes to make the individualised interpretation visible. With tacit knowledge, the person may not even be aware of what they know or are learning. Evaluating the results or following the progress of different types of knowledge and learning may not be possible, at least with traditional approaches.

2.4 DISCUSSION

This chapter has presented the policy context for the study, bringing up the challenges for the information society, the important role of education and training, and the difficulties that arise from the broad nature of lifelong learning. New ways to value and acknowledge learning are needed in order to support relevant lifelong learning opportunities for everyone. Learning takes place throughout people’s lives, with no specific point where it begins or ends – and learning about one thing enables people to learn about another. This report approaches learning as a process encompassing any topic and any setting, where there are some prerequisites for entry into this process, and some learning outcomes that follow as a result. People can be and typically are involved in more than one of these processes at the same time throughout their lives.

The policy documents reviewed emphasize several issues relating to ensuring that the prerequisites for lifelong learning are in place, and that learning is organised and supported by different institutional structures with relevant objectives and certification measures for learning. Figure 2 gathers together the policy aspects reviewed. Most of the policy papers concentrate on formal education, although some also emphasize the importance of supporting non-formal training and learning opportunities. Most do not touch upon informal learning, or the opportunities ICT could bring to developing lifelong learning so that it combines formal, non-formal and informal learning. This report and the overall study aim to contribute to this specific area. The development of technologies and their high penetration in all aspects of society and the economy also make them important for learning. People need to use these technologies for their work and life; hence they need to learn skills to use them confidently and efficiently. However, learning technology-related skills – or using technology to learn about another topic – also creates new requirements for entering the learning process, causing challenges for inclusion and equity.

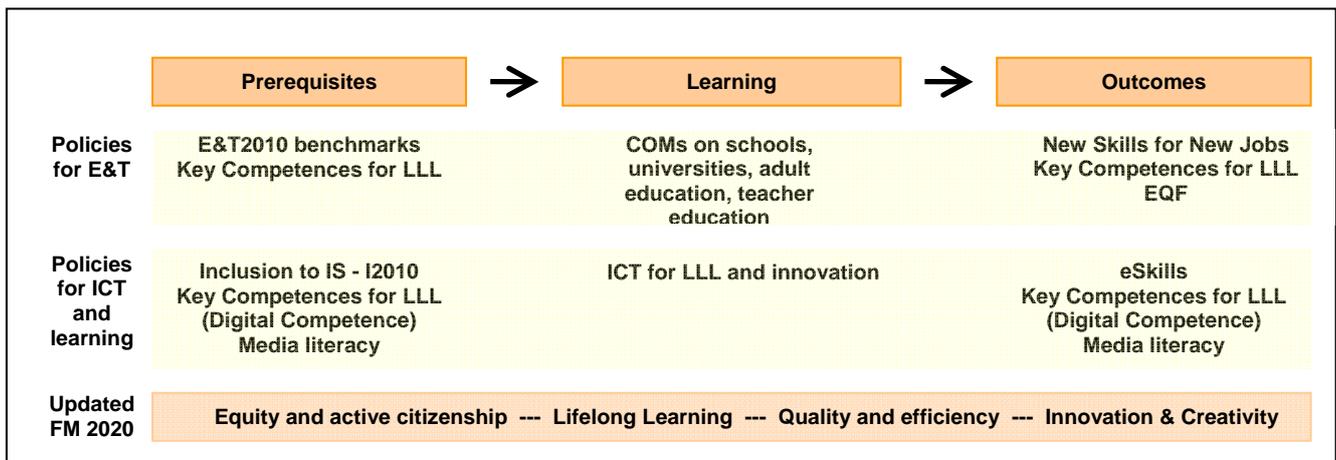


Figure 2 : Lifelong learning (LLL), ICT and E&T policy aspects reviewed in this chapter

3 THEORETICAL PERSPECTIVES

This chapter reviews theoretical perspectives that are useful for exploring learning in ICT-enabled communities. First, it discusses learning on the individual level, and aspects which affect the form, effectiveness and outcomes of learning by individuals. Then, as learning is not a separate individual activity but relates to the social environment, the chapter goes on to discuss models, approaches and theories related to people learning together with the help of one another. The third section brings up the perspectives on communities in online settings and mediated by technologies.

3.1 LEARNING OF THE INDIVIDUAL

From the cognitive perspective, learning is considered as building and reforming cognitive structures. Humans are basically seen as guided by mental schemas that affect how they perceive and learn information, which in turn develops their mental schemas further (Neisser, 1981). Learners are seen as individual information processors, learning both declarative (facts) and procedural (strategies) knowledge. However, environmental, emotional and social aspects also have important impacts on what is actually learned, as will be reviewed in this section.

3.1.1 Constructing knowledge

Constructivism emphasizes the active role of the learner and the interaction with the environment. Learning includes the assimilation of new knowledge to existing structures as well as the accommodation of existing knowledge and structures to new situations (Piaget, 1977). Hence, knowledge is not a commodity to be transmitted – delivered at one end, encoded, retained, and re-applied at the other – but an experience to be actively built, both individually and collectively (Ackermann, 2004). Vygotsky (1986) emphasizes the role of language and other cultural artefacts in mediating interactions. By expressing ideas, or giving them form, these can be made tangible and shareable which, in turn, helps to shape and sharpen these ideas. Externalising ideas is essential for communicating with others as it is possible to negotiate meaning only through tangible forms (Ackermann, 2004).

Papert's constructionism⁹ adds to the picture the opportunities offered by ICT, emphasizing the fact that people learn better when they are engaged in building personally meaningful artefacts and sharing them with others. He views the computer as a powerful tool for this purpose as it can support new ways of thinking and learning. By constructing an external object to reflect upon, people also construct internal knowledge. For example, his work on programming with turtle graphics showed how children learned to create complex activity and instruction paths, situating themselves as the turtle that draws lines and forms, and seeing concretely the results of their work when trying out new ideas.

Bruner (1961) emphasizes the importance of discovery, where the learner asks questions and through them discovers new facts, relationships and truths. The learner selects and transforms information, constructs hypotheses, and makes decisions, based on his/her previous knowledge and experiences. According to Bruner, interest in the topic to be learned is the best stimulus for learning. Learning through inquiry and discovery promotes independence and responsibility for the learning, encouraging learners to be actively engaged in a tailored learning experience. Furthermore, he suggests that any subject can be learned effectively by any child in any stage of development, with a suitable approach (Smith, 2002).

3.1.2 Experience and reflection

Schön (1987) discusses the importance of concrete experience and 'reflection-in-action' in the context of creative processes. Reflection-in-action refers to conscious thinking on the unique situation in which the action takes place. During the active process, practitioners think and draw upon their repertoire of

⁹ See work of Seymour Papert e.g. at <http://www.papert.org/>

images, ideas, examples and actions from previous experiences. Thus they engage in the activity, which in turn generates a new understanding and changes the situation. Reflection on action takes place afterwards, developing questions and answers about the practice after the encounter. Individual experience is crucial, and a skilful dialogue between a coach and student, situated with students' doing and elaborating on it, enhances student's action and understanding.

Kolb (1984) defines learning as a process whereby knowledge is created through the transformation of experience (p.38). His model of "experiential learning" describes learning as an ongoing cycle, where learning occurs through a sequence of phases where concrete experiences generate an opportunity for observation and reflection. This, in turn, leads to the creation of new concepts and models that are then tested in upcoming situations, giving rise to new experiences. In order to make the learning cycle effective, learners need four different types of skills. They have to be able to engage openly and without prejudgement in new experiences, reflect and observe their experiences from many perspectives, create concepts that integrate observations into logically sound theories, and, finally, use these theories in decision making and problem solving. He developed the Learning Style Inventory to assess individual orientations to learning, based on the axes of 'concrete experience' – 'abstract conceptualisation' and 'active experimentation' – 'reflective observation', thus identifying four learning styles, as depicted in Figure 3:

- **Convergers** rely on abstract conceptualisation and active experimentation. Their strengths are in problem solving, decision making and practical application of ideas. They prefer to deal with technical tasks and problems, rather than social and interpersonal issues.
- **Divergers** emphasize concrete experience and reflective observation. They have high imaginative ability and awareness of meaning and values. They can generate alternative ideas and implications, are interested in people, and tend to be imaginative and feeling-oriented.
- **Assimilators** are strongest in abstract conceptualisation and reflective observation. They can assimilate observations into theoretical models, and are more interested in logically sound theories than their practical application.
- **Accommodators** are strong in carrying out plans and getting involved in new experiences. They are good at opportunity seeking, risk taking and action and adapting to changing circumstances. They tend to solve problems with intuitive trial and error tactics and rely on other people for information rather than on their own analytic ability.

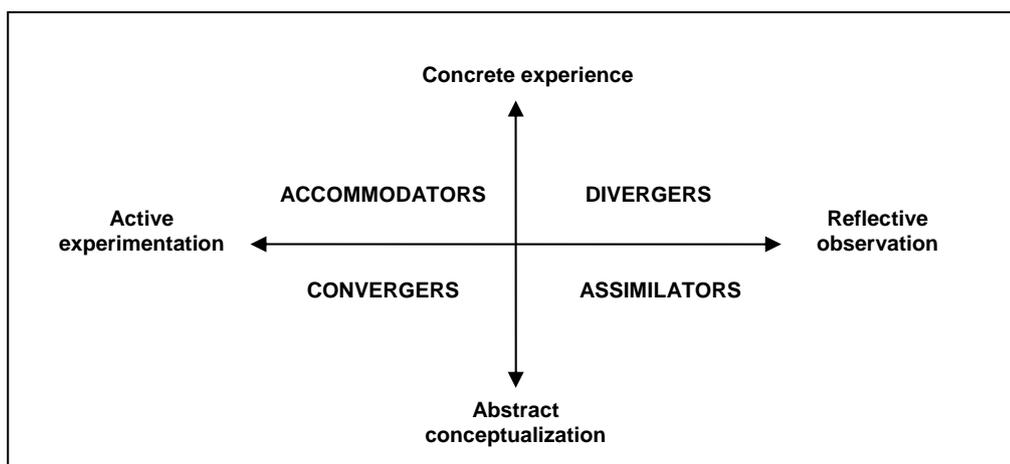


Figure 3: Kolb's model of experiential learning and learning styles (Kolb, 1984)

Dewey's model of experimental learning emphasizes the unpredictability of the world and is closely related to practical action (Tuomi, 2006). When there are surprises, "errors" in an activity, it does not lead to expected outcomes and creates a need to reinterpret the world. This leads to a cycle of problem-based learning, which starts from recognising a mismatch, then proceeds into conceptualising a problem, developing a solution and finally to validating the solution. Engeström's (1987) 'learning by expanding' incorporates into the model the idea that learning is not something that occurs only inside an individual mind, and is not only about changes or 'fixing errors' in individual behaviour. According to him, learning is a creative and innovative process that changes current practices and habits into new forms of social activity and practice (Tuomi, 2006).

3.1.3 Self-regulated learning

The construct of self-regulated learning has lately received attention, as it is seen as important for making learning more efficient in the information society (Dignath et al., 2008). It is considered, both in recent research and policy literature, as the means and competence requirements for lifelong learning. The term self-regulated can be used to describe learning that is guided by metacognition (thinking about one's thinking), strategic action (planning, monitoring, and evaluating personal progress against a standard), and motivation to learn (Zimmerman, 1990). A self-regulating learner reflects on his or her progress towards a learning goal and adjusts his or her actions to maximise the performance. Skills for self-observation, self-evaluation and self-reaction are important characteristics for effective self-regulated learning (Zimmerman, 1990). However, self-regulation involves monitoring and regulating not only one's cognitive activities, but also emotional and motivational processes (Steffens, 2006).

Boekaerts and Niemivirta (2000) emphasize the need to take into account learners' personal goals, which may conflict with the imposed goals in the classroom. Teacher-set goals may not be considered relevant nor do they develop self-regulation skills, when students are not given the chance to establish and pursue personal, non-trivial goals. In her model of adaptable learning, Boekaerts considers meta-cognitive as well as meta-motivational self-regulation skills. She assumes that in a stressful event, learners may decide to pursue either learning goals (mastery mode) or self-defensive goals (coping mode). Personal goals and interests play an important role for learning. Well developed individual interests can help individuals overcome low ability and/or perceptual disabilities (Hidi, 2006). Interest is related to motivation, which can be intrinsic (to know, to accomplish, or to experience), motivating to a behaviour for its own sake. Extrinsic motivation leads into engaging into behaviours as a means to an end, and can be related to external rewards and constraints, internalising reasons based on previous external consequences, and identifying external outcomes as important for oneself (Vallerand et al., 1992). Furthermore, amotivation may occur when individuals do not perceive contingencies between outcomes and their own actions. According to Hidi (2006), Renninger (2000) argues that individual interest is an evolving relationship between a person and a particular subject content and curiosity questions can only be formulated if one has a certain level of understanding of the topic.

Self-directed learning is another term often mentioned in the context of lifelong learning. It can be described as the opportunity provided for self-regulated learning to take place, by allowing learners to decide about their learning objectives, resources and processes. Fischer & Sugimoto (2006) characterise the important features of self-directed learning as i) it is less structured than instructionist learning, ii) it is often a group or joint activity, iii) the goal is motivating for the learner, iv) the activity is perceived as captivating, v) the activities are self-paced, and vi) the learner has a choice of topic, time, and place. In order to be successful, implementing a self-directed learning approach requires both good design and skills for self-regulated learning.

3.2 LEARNING IN SOCIAL CONTEXTS

Social learning theories and discussions emphasize the role of social interaction and context in the development and learning of the individual. The focus is less on what is learned than on how the

learning takes place (Brown & Adler, 2008). The literature on networked learning often emphasizes learning as a social activity that takes place through a social process of knowledge construction. It highlights the importance of discussion and discourse, the creation of shared meanings and the opportunities for reflection with others (Allan & Lewis, 2006).

3.2.1 Social learning

Vygotsky (1978, 1986) puts emphasis on how the presence of adults with greater expertise can enhance a child's self-directed learning, and how shared cultural artefacts are used to help mediate this process. Each learner has a 'zone of proximal development' (ZPD) containing knowledge that can be learned with guidance from an expert. Hence, a person's cognitive development proceeds outside-in, i.e., from other to self: first between people (on social level), and then inside the person. Brown et al. (1989) argue that knowledge is situated, and activity and situations are integral to cognition and learning. The understanding of content is socially constructed through conversations about that content and through grounded interactions, around problems or actions. They raise the idea of cognitive apprenticeship, which supports learning in a domain where students are enabled to acquire, develop and use cognitive tools in authentic activity. Lave & Wenger (1991) emphasize the situated role of learning, saying that learning normally occurs in a function of the activity, context and culture, and is not necessarily deliberate but can be unintentional. This contrasts with classroom learning activities which involve abstract knowledge out of context and may result in learning that learners are unable to apply to real contexts. Social interaction is a critical component of situated learning.

The social learning theory of Bandura (1977) describes the importance of observing and modelling the behaviours, attitudes, and emotional reactions of others. He maintains that people do not need to learn everything by trying it themselves, they can learn from observing and modelling others. Human behaviour is seen as a continuous interaction between cognitive, behavioural and environmental influences. Observational learning consists of four phases: 1) paying attention to the features of the modelled behaviour, 2) retaining, remembering and coding the behaviour, 3) reproducing, repeating and practicing the behaviour, and 4) motivation for reinforcing or discouraging the modelled behaviour. Individuals are more likely to adopt a modelled behaviour if it results in outcomes they value than if it is unrewarding or has punishing effects.

In socio-cultural participation, active participation itself is seen as a process of appropriation, with social and cultural aspects of knowing. Learners participate in a wide variety of joint activities which provide them with the opportunity to synthesise several influences into new ways for them to understand and participate. By internalising the effects of working together, the novice acquires useful strategies and crucial knowledge (John-Steiner & Mahn, 1996). Learning through intent participation takes place in many settings, allowing for example children to learn individual skills, understandings and competencies through listening and observing when participating in adult community activities (Rogoff et al, 2003). Rogoff proposes three planes of activity within a group: apprenticeship (the community plane), guided participation (the interpersonal plane), and participatory appropriation (the personal plane). The members of a given community undergo a process of socialisation that could be called 'apprenticeship'. During this apprenticeship process, participants benefit from guided participation provided by community members and by observing communal activities and events. This leads to individual members' processes of participatory appropriation, which allow them to participate fully in shaping and being shaped by their community. In this context, learning is seen not as an independent, individual process with social aspects but rather as a product of participation in a community. The learner becomes prepared for participation through the process of participation itself.

3.2.2 Communities of practice

Wenger (1998) defines communities of practice (CoPs) as important places for negotiation, learning, meaning, and identity. There are three properties that define a community of practice. Firstly, members interact with one another, establishing norms and relationships through mutual engagement. Secondly, members are bound together by an understanding or a sense of joint enterprise. Finally, members

produce over time a shared repertoire of communal resources, including, for example, language, routines, artefacts and stories. Communities of practice are not stable or static but evolve over time, as new members join and others leave. Communities of practice cannot simply be set up by an external force, but they can be encouraged to emerge and supported to develop. For example, a business can establish a team for a particular project, which may, in time, emerge as a community of practice.

CoPs can help practitioners to develop a shared meaning and engage in knowledge building among members in informal collaboration (Hara & Hew, 2006). In a CoP, a group of professionals can gather and organise themselves, face to face or virtually, in order to: i) share information and experience, related to their field of intervention, ii) exchange and cooperate in order to solve together the problems with which they are confronted in their occupations, iii) learn from each other and thus develop their professional competencies, iv) build (improve and/or create) together knowledge and formalise the best practices to be followed in the realisation of their daily activities. These individuals share a common interest and are led by a desire and a need to share a concern, a whole set of problems, or a passion for a subject. However, it is important to note that communities of practice are not formed only for professional purposes, but also for sharing and building practices for other spheres of life by people who have a common interest, experience and expertise.

Lave and Wenger (1991) propose that situated learning can take place within the context of a community of practice by the means of legitimate peripheral participation. Initially new learners learn from other members of the community by observing and listening, and taking on supporting tasks. As learners gradually gain in experience and skill, which include taking on the values and ways of thinking of the more experienced members of the community, they will gradually assume more responsibility and eventually become fully-fledged members of the community (Miao, 2004). In this way, by participating in the community, the participants can develop their identities from being newcomers to becoming competent experts. However, Roberts (2006) suggests that there are also challenges in communities of practice, which hinder the dynamics and effectiveness of the community. Power structures outside the community may be reflected in power relations within CoPs, and competition between members may reduce trust and discourage collaborative efforts, hindering expression and interaction which would support new learning. The communities may even become static in terms of their knowledge base and resistant to change, neither evolving themselves nor providing a space for new meaning-making processes for their members.

3.3 LEARNING IN ONLINE COLLABORATION

As already mentioned, individual learning can be supported by social interaction and participation in communities. The availability of ICT and the Internet gives new opportunities for finding, forming, managing and participating in communities with members from diverse locations and with diverse characteristics. Eronen (2005) suggests that while the introduction of new digital media can strengthen the sense of community, local communities appear to erode at the same time as global communities are being formed via the Internet. He suggests that the human need for affiliation is at least as important as the need for the information, as a motivation to form and participate in technology-mediated communities. The opportunities offered by online communities are at the forefront in facing the challenges of supporting lifelong learning.

Preece (2000) defines an online community as having the following features:

- people who interact socially while striving to satisfy their own needs;
- shared purpose (an interest, need, information exchange, or service) that provides a reason for the community to exist;
- policies in the form of tacit assumptions, rituals, protocols, rules, and laws that guide people's interactions; and
- computer systems that support and mediate social interactions and facilitate a sense of togetherness.

The benefits of this broad definition are: (1) it encourages a balanced view of both social and technical issues; and (2) it is widely applicable to a range of communities. For example, it applies to communities that exist only online as well as communities that meet both online and offline. Key qualitative factors for the community are sociability (social interactions in the online community), and usability (human–computer interface) (Preece, 2000).

In this report, we follow this broad definition. However, following the suggestion of Cardon and Aquiton (2007), we also consider the collective activities that follow from individual intentions. In these cases, there is not necessarily an overall ‘sense of togetherness’ but small reciprocal circles and dynamically forming and changing networks. For example, the blogosphere contains many individuals who are networked and sometimes form communities linking blogs with each other or when readers, commentators and blog writers connect around one blog.

3.3.1 Connectivism

Siemens (2006) argued that the traditional learning theories were developed at a time when learning was not affected by technology. According to him, behaviourism, cognitivism and constructivism as such emphasize learning inside the person, and even social constructivism can not provide adequate theoretical support to the new learning approaches with technologies. These theories do not address learning that occurs outside of people (i.e. learning that is stored and manipulated by technology). They also fail to describe how learning happens within organisations. According to Siemens, it is the network itself which is the basis of the learning processes. The knowledge society requires the individual to continuously update his knowledge, and this cannot happen as a process of progressive “knowledge accumulation”. Instead, this must occur through building, maintaining and utilising connections. Connectivism is characterised by nine principles (Siemens 2006):

- Learning and knowledge require diversity of opinions to present the whole, and to permit selection of best approach.
- Learning is a network formation process of connecting specialised nodes or information sources.
- Knowledge rests in networks.
- Knowledge may reside in non-human appliances, and learning is enabled/facilitated by technology.
- The capacity to know more is more critical than what is currently known.
- Learning and knowing are constant, on-going processes (not end states or products).
- The ability to see connections, recognise patterns and make sense between fields, ideas, and concepts is the core skill for individuals today.
- All connectivist learning activities aim to be current (producing accurate, up-to-date knowledge).
- Decision-making is learning. Choosing what to learn and the meaning of incoming information is influenced by a shifting reality. While there is a right answer now, it may be wrong tomorrow due to alterations in the information climate affecting the decision.

In this perspective, the true competence for a lifelong learner in the knowledge society would be the capacity to “stay connected” and “belong” to digital communities, where interests can be shared and developed continuously. Pettenati and Cigognini (2009) discussed the skills needed for a lifelong learner in a connectivist environment. They emphasize the need for personal knowledge management skills. These include, firstly, basic skills for creating, organising and sharing in the digital environment, and secondly, higher-order skills. The latter relate to 1) being connected and networked, 2) balancing formal and informal learning contexts, 3) being able to look at internet resources critically, and 4) having a creative attitude to finding new ways and opportunities for knowledge construction.

3.3.2 Community of inquiry

A Community of Inquiry (COI) is a framework for modelling online collaborative learning processes based on the problem-based learning cycle posed by John Dewey (Garrison & Arbaugh, 2007). The framework consists of three elements – *social*, *cognitive* and *teaching* presence (see Figure 4). There is a large body of literature which employs this model in the study of collaborative learning, especially in higher education. In their review of research that utilises this model, Garrison & Arbaugh (2007) find evidence of the importance of all the elements. Their review points out that care needs to be taken in order to encourage social interaction and to provide structure and support early on. Although socio-emotional communication is important for learners, it is not sufficient for educational purposes but reflective thinking and discussions are needed for learning and real inquiry to take place.

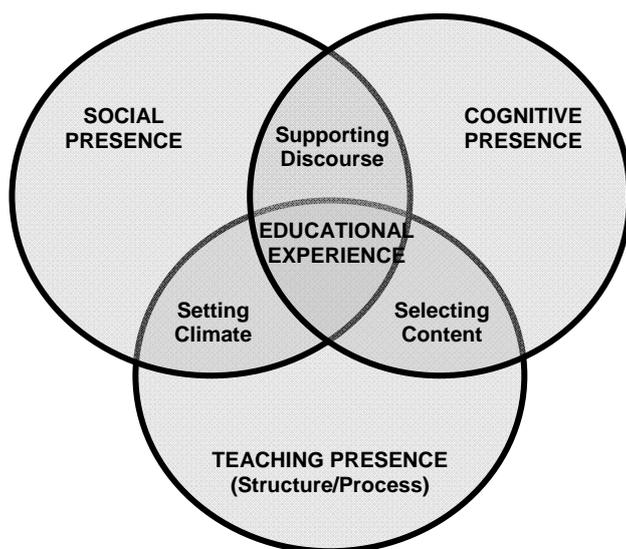


Figure 4: Community of inquiry framework (Garrison & Arbaugh, 2007)

Many of the studies using COI framework bring up aspects related to social and cognitive presence, relevant for all online communities. However, as reviewed by Garrison & Arbaugh (2007), a large part of the research based on the COI framework emphasizes the need for well-designed tasks, and for teaching presence in order to facilitate learning. Hence, this is not a model to be directly applied to self-organising learning communities without specific teacher roles and learning tasks. However, it is worth studying whether the teaching presence can be substituted by peers, community support and self-regulation in learning.

3.3.3 Activity theory

Activity theory is a cross-disciplinary framework for studying different forms of human practices, both at individual and social levels, including the use of artefacts (Kuutti, 1996). It has been used to analyse computer-supported collaborative activities, as it provides a means for studying actions and interactions with artefacts within a historical and cultural context. Figure 5 presents the activity system model by Engeström (1987). It is composed of actors, community and objects, which engage in a transformation process through division of labour, rules and mediating artefacts (instruments). The model can be used to recognise contradictions on different levels in the activity system, such as primary contradictions within elements (e.g. problems in division of labour), or secondary contradictions between elements (e.g. problems that actors may have with mediating artefacts). By analysing the conflicts within and between elements, taking into account the historical perspective, the activity system can be better understood and developed. The model has been applied to online learning systems, e.g. by Benson et al. (2008), Blin & Munro (2008), Conole (2008).

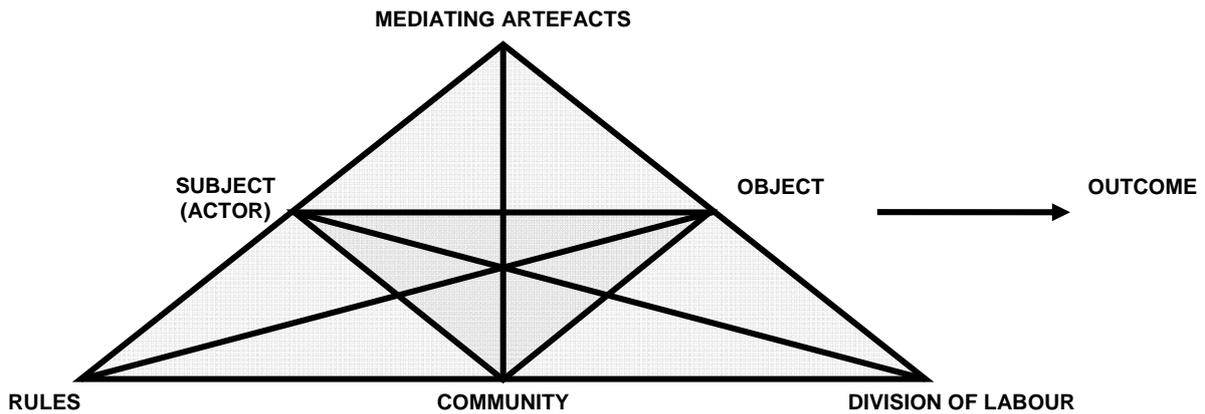


Figure 5: Expanded activity system model (Engeström, 1987)

3.4 DISCUSSION

Learners build their understanding on the foundations of their previous skills and knowledge by reflecting on their experiences and needs. Personal motivation to understand or to learn can be invoked by the environment, and the meaning-making process is guided by social interaction and negotiation. Language and tools are necessary for mediating and discussing meaning, and shaping ideas in explicit forms develops one's own understanding. The social context is important for learning, and provides the individual with the emotional, behavioural and knowledge context to develop as a person with others and as a part of that context. As no individual can retain all information, learning to be networked and collaborate with others in different settings are important skills in themselves for lifelong learning.

Technologies can provide new reach, speed, visibility and knowledge organisation facilities for networks and communities with a wide range of participants. This availability of easy connections to information and people (experts on different issues) further emphasizes the need to shift from learning facts and figures to learning strategies and culture. Finding and participating in relevant and dynamic communities can support continuous development of problem-solving skills. However, effective strategies for self-regulated learning are important for supporting individual learning in the networks and communities.

Bruner's (1996) cultural-psychological approach to education gathers together many of the aspects touched upon in this chapter. He emphasizes the following: 1) the importance of perspective in making meanings, 2) the constraints that arise from building mental structures by reforming existing ones and the limits of mediating languages, 3) the construction of both personal meaning and the world around oneself, 4) the importance of interaction, 5) the importance of externalisation, 6) education is instrumental for society, 7) the institutionalisation of education, pointing out the need for commitment of actors, 8) the importance of identity and self-esteem, and 9) narratives as a vehicles for meaning making. He suggests that education should help those growing up in a certain culture find an identity within that culture, in order to be able to make meaning. Narratives are essential in constructing an identity and finding a place in one's culture, and schools should nurture and cultivate them. Consciousness, reflection, breadth of dialogue and negotiation (in social environments) play an important role in all these tenets.

The previous chapter discussed aspects of lifelong learning, and concluded that policy efforts emphasize the prerequisites for learning, the learning activity for different groups of lifelong learners, and the learning outcomes. The theoretical perspectives reviewed in this chapter enrich the picture with different aspects of these viewpoints. In the context of online learning communities it seems

especially worth considering different perspectives relating to the learning activity, which have also been inspired by Garrison & Arbaugh's framework (2007): 1) cognitive progress, i.e. individual learning, which is supported by 2) the social context as a place for participation and transformation, and 3) the structure of learning process, which comes from the explicit external actors (teacher), or through self-regulation, or from the rules, norms and tools of the community.

Figure 6 gathers together the different aspects discussed in this chapter. In online communities, ICT affect, and are present in, all of these aspects as mediators, context-setting tools and objects.

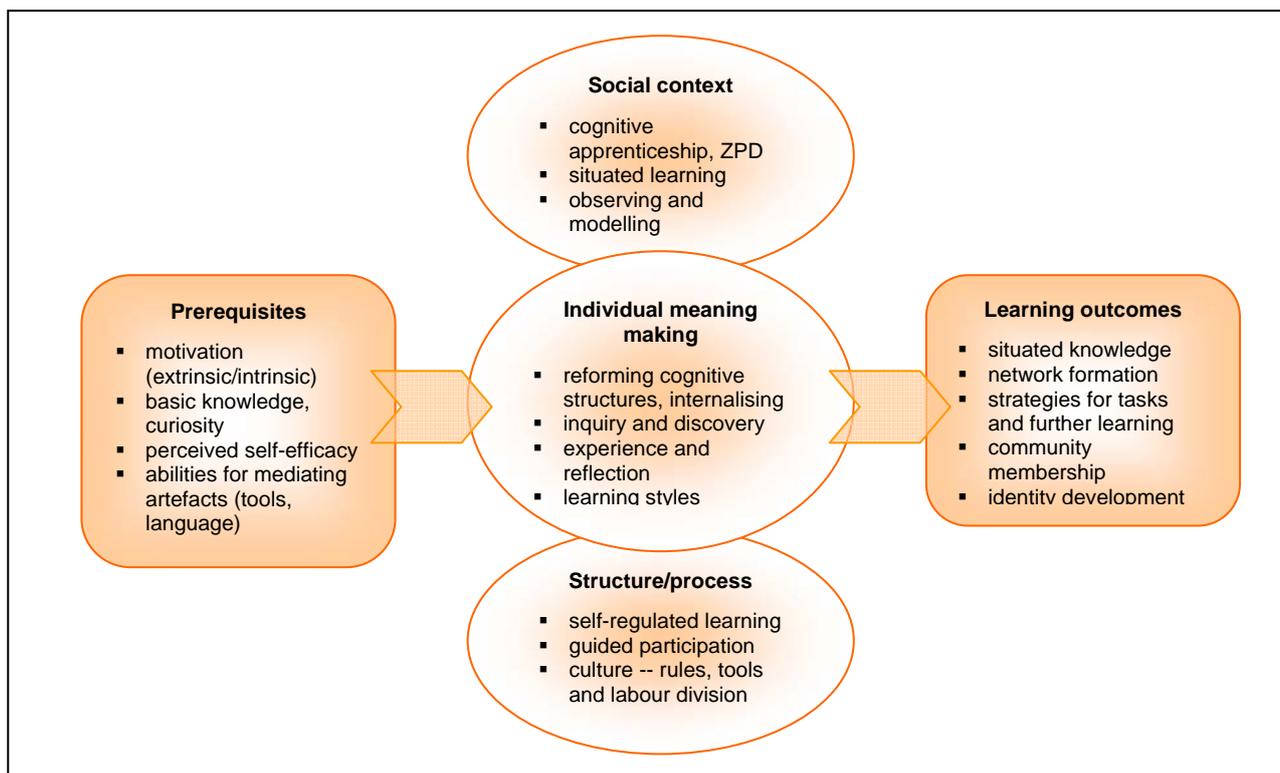


Figure 6: Concepts and aspects for learning in online communities

4 EMERGING ONLINE NETWORKS AND COMMUNITIES

Rudd et al. (2006) suggest that it will not be possible to personalise education if the concept that learning happens only in certain places under certain assessment regimes and involves certain people is maintained. There is a need for learning networks that link people, homes, communities and multiple sites of learning. The recent phenomenal growth of social computing (Pascu, 2008) supports this in new ways by facilitating the networking of people and resources. This report approaches the question of what the link is between emerging ICT-enabled communities and learning by first exploring the drivers that gather people from different settings together into joint spaces, and then studying learning aspects of these connective and collaborative settings.

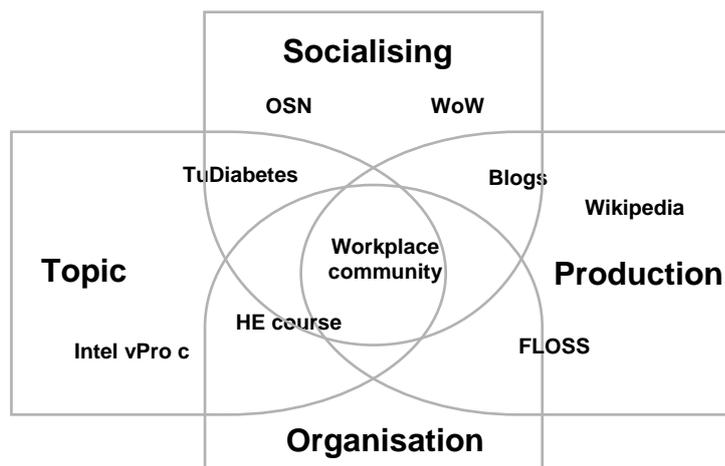


Figure 7: Participation drivers for online networks and communities with examples

After the impressive take up of social computing, with continuous emergence of new innovations, a great variety of different online collaborations now exist. There are various reasons for their existence and they support various types of activities for their participants. Based on the literature and data reviewed, this report suggests that major drivers for participation are i) a joint task or production, ii) a common interest in a topic, or iii) social connection. Furthermore, for example at the workplaces or educational institutions, online participation may be a required or recommended activity to enable processes in the organisation. Figure 7 gives some community examples relating to these different participation drivers.

Individuals may have several motivations for participating (e.g. searching for social connection in a topic-based community, such as TuDiabetes), but the emphasis on different activities varies in different platforms and networks. Not all online collaborative approaches fulfil Preece's definition (2000) of online communities, because the collaborative aspect may be quite loose. Ryberg and Larsen (2008) suggest that we are witnessing a seemingly contradictory trend (networked individualism) in which personalisation and individualisation are intensified, but at the same time people are increasingly mutually dependent on and connected to each other.

This chapter approaches describing different types of online networks and communities through the above suggested participation motivations (joint objective, common interest/situation, and socialising). Later chapters will continue discussing the relationship between learning and these different participation aspects.

4.1 PARTICIPATION FOR A COMMON TASK OR PRODUCTION

There are many examples of online networks forming around an explicit goal or production activity. Different socialisation and discussion facilities help members to link up and negotiate the co-creation and building of a collaborative product or resource. These facilities can enable co-operation between members so that collaboration and working teams are transformed into communities. Large scale collective productions can also result from small contributions where individuals or small groups contribute and participate to the initiative from their own perspectives and objectives.

4.1.1 Production communities

Project and production communities can form when people gather together to build a certain product or complete a task and get engaged with both the task and the collaborating people. Often the product can be continuously extended or improved, so that the community keeps together even after the initial objective has been achieved.

Collaborative joint resource creation. Wikipedia is an example of a highly collaborative multicomunity for a specific task. The active participants are developing the encyclopaedia as a large scale joint objective, the results of which are valuable for many visitors as well. Many small communities have formed to take responsibility for developing and updating specific sets of pages. Bryant et al. (2005) studied nine "Wikipedians" showing how their roles changed when they became more active. At the beginning, they were mainly concerned with writing personal papers. However, as they became more involved in Wikipedia practices, they adopted new goals. They became more concerned with the quality of Wikipedia content as a whole, taking on more "administrative" roles in the site. Cardon & Aguiton (2007) suggest that this transformation of user goals, from individual interest to collective concern, can also be observed on other relational sites where people share user-generated content such as Flickr or YouTube.

Platforms for collaborative creativity. There are collaboration platforms that facilitate people to start new productions and enable communities to form around each product. Some of these initiatives also allow these creative communities to earn money from the end results through sponsorship of the production or marketing the product. These platforms and communities are places for 'semi professionals' to meet, work and improve their skills. Wreck a Movie¹⁰ is an online collaborative film community for creating short films, documentaries, music videos, Internet flicks, full length features, mobile films and more. Everyone can participate, but each production has a leader, with more decision power than the average users. Song Community¹¹ is an example of collaborative music making, where people can create lyrics, riffs, samples and melodies, compose new songs and improve the ones others have started. All song versions are stored with version management, and people can vote on best lyrics and riffs.

Open source software development. Free and Open source software (FLOSS) development communities are a form of online collaborative communities that have existed for a long time. They are open to anyone interested in participating. Concrete contributions for software development can be made only by people with at least basic skills in programming, but anybody can participate by giving feedback and suggestions for the development of the software and its usability. FLOSS projects have developed innovations and products with considerable economic value and form part of software companies' business models (Ala-Mutka, 2008). Projects often start small and get bigger if they raise enough interest and motivation for others to join. Lakhani and Wolf (2005) found that the strongest driver for participating was intrinsic motivation, even though 40% of respondents were paid for participating in the FLOSS projects. The top reason for contributing among all respondents was participating in an intellectually stimulating project (44.9%) and improving their own programming skills was a close second (41.8%). For those who did not participate as part of their work, the main

¹⁰ <http://www.wreckamovie.com/>

¹¹ <http://www.songcommunity.org/>

motivation was improving their skills (45.8%) or because they needed the software (37%) (Lakhani & Wolf, 2005). The survey showed that personal value was considered more important than, for example, the ideology of participating in an open source community or beating commercial software, although these are often considered to be major drivers.

4.1.2 Crowd sourcing for tasks and resources

There are different types of explicit and implicit crowd sourcing initiatives and platforms, which gather together contributions from different people, who may have prepared these independently as part of their own activities. Not all these people necessarily connect with each other to form communities, but the facilities provided for linking and following people with similar contributions enable the formation of smaller community circles among them. Furthermore, task-based initiatives can sometimes be intensively collaborative communities, if only for a short time.

Crowd sourcing for a joint task. Task-based communities can be created on purpose or are formed ad hoc, crowd sourcing people possibly previously unknown to each other for working on a joint task. A well known early example was the book ‘Code and Other Laws of Cyberspace’ by Lawrence Lessig, first published in 1999. After the book had been in print for five years, during which time law, technology, and their context had changed considerably, Lessig opened the updating and editing process to all, to draw upon the creativity and knowledge of the crowd.¹² These kinds of communities can also form spontaneously, as illustrated by the example of the wiki community for the annotation of Thomas Pynchon’s novel (Schroeder & Besten, 2008). Due to the large number of participants, this task was carried out quickly with great range and depth and with several links to other work. The participants themselves benefitted from the experience and a still growing open resource for others interested in literature research was created. An example of a joint project, which does not show strong community aspects among members but provides an opportunity for individuals to participate in a collective task, is Galaxy Zoo,¹³ an online astronomy project which invites members of the public to assist in classifying over a million galaxies.

Resource repositories. Networks and communities may be set up for gathering materials of common interest or usage, or simply allowing others to use one's materials. Instead of working on a joint task or product, participants share looser joint objectives of producing and sharing. Individuals can create and produce their own contributions, taking into account their personal objectives for their tasks, and, at the same time, share the work results with others in a joint space. The platforms allow people to search, follow, comment on and sometimes also rate the contributions of others. For example, Slideshare¹⁴ is a site where people can share their presentations, and Scivee¹⁵ allows researchers to upload their technical papers and podcast videos explaining the research results in the papers.

Social knowledge management systems. One type of knowledge repository building are server-based applications for personal knowledge management, which allow different users to link with each other through their contributions. For example, del.icio.us is a social bookmarking and tagging system that allows people to evaluate online content by storing bookmarks with tags of their own choosing (describing the meaning that the content has for them) and to access these bookmarks from any web browser. Users can form networks to follow the bookmarks of others and recommend their bookmarks to others. They have access to a global network of bookmarkers, and denser connections within their self-built community. Connotea¹⁶ provides specific support for storing, managing and sharing literature references among researchers, students or anyone. StumbleUpon¹⁷ provides a new way of discovering materials based on own interests and recommendations of others, taking into account the groups created with other users. This kind of systems can make implicit knowledge visible

¹² <http://www.code-is-law.org/>

¹³ <http://www.galaxyzoo.org/>

¹⁴ <http://www.slideshare.net/>

¹⁵ <http://www.scivee.org/>

¹⁶ <http://www.connotea.org/>

¹⁷ <http://www.stumbleupon.com/aboutus/>

(transforming it into explicit knowledge) in new ways and have the potential to build interest-based networks of people not otherwise known to each other, but who contribute to each other's knowledge by sharing and following the resource developments.

4.2 PARTICIPATION FOR A COMMON INTEREST IN A TOPIC

Topic-driven participation gathers together people who have a common context, knowledge or interest in sharing, exchanging and learning from each others experiences. This results in both loose networks and tighter communities with active mutual participation and sharing.

4.2.1 Professional communities

Online professional communities provide interaction and collaboration opportunities for workers to exchange and develop knowledge and connect with other professionals in different organisations. In addition to expert members, open communities also allow novices to connect with and learn from their expertise.

Knowledge sharing with experts. Andrews et al. (2001) pointed out that mid-life career changers have important needs for networking with peers to share information, learn from each other's experiences and make contacts in potential new career disciplines. These types of networks and communities can emerge from the initiative of individuals, associations or, sometimes, companies, as demonstrated by the example of Intel Pro Center.¹⁸ Hew & Hara (2008) found that participation in an online e-mailing list community offered a viable avenue for the continuous professional development of nurses. They were provided with the opportunity to make more informed decisions about their professional practice and keep up-to-date with changes in their specialty areas. Despite the lack of a personal, face-to-face relationship and the easy alternative of free-riding on the contributions of others, frequent knowledge sharers feel obliged to contribute knowledge because they have received help from others previously, or because they see it as a down payment for future help. They also contribute because they want to benefit the profession by sharing necessary knowledge, and they feel they can personally gain more knowledge in return. However, it is important that the sharing environment is respectful, and that the communication technology is easy to use.

Professional skills development. According to the King Research (2007) survey of IT professionals using IT online communities, 75% of the respondents said that communities help them to do a better job and 68% stated that they benefited personally in their professional development. Other examples for professional skills developments are emerging with new collaborative platforms. Lulu¹⁹ is an example of a collaboration, publishing, and marketing system that supports semi-professional authors by providing them with the possibility to get comments on their intermediate book versions. Revver²⁰ is an example of an online video platform and community, which helps video creators to develop their skills. Thomas (2005) comments on the trAce Writing and Technology Research Project, an ICT-enabled professional community for writers established in 1995, which enables writers to connect with each other across physical boundaries. The need for a more personalised teaching approach encouraged participants to create innovative training and support systems. Twinning, mentoring, and partnering was seen to work better for creative artists than group training. Training was more successful when it was 'by the back door' via specific projects, rather than training for training's sake. Furthermore, through the ICT-enabled community, the community creators learned a different understanding of the needs of the local literary community, although first met with some hostility and accusations of elitism because of a large initial knowledge gap.

¹⁸ <http://communities.intel.com/community/vproexpert>

¹⁹ <http://www.lulu.com/>

²⁰ <http://www.revver.com/>

4.2.2 Interest-based communities

In addition to job-related interests, various communities have been formed and platforms set up around topics for personal well-being, health, culture, leisure and learning. Some of the many examples are presented here.

Personal well-being and life style. Many people have health conditions that require regular, maybe even continuous attention, and, especially in the phase of adapting to the condition, online communities for interacting with professionals and peers with more experience, can provide important personal support. For example, Rubinelli et al. (2008) studied a community composed of both professionals and patients affected by chronic low back pain and found it successful for learning self-management of the disease. The success factors included 1) tailored answers to user requests, 2) quick answers to questions (within 2-3 days maximum), 3) optimisation of health professionals' efforts through managed content mediation, and 4) an interdisciplinary implementation team. There are also numerous communities for encouraging, supporting and sharing different living styles, situations or ideologies, for example VeganItalia²¹ for vegans or discussions foras and groups for young mothers, BMW owners, or people who want to stop smoking cigarettes.

Communities for context and culture. Nationality, culture and religion-related networks and communities can connect people online despite physical distances, and may therefore play an important role, for instance, for immigrants. LoonLounge²² is an example of a network which links communities so that it is possible to connect people from different countries of origin with interest in asking and giving advice on life in Canada. These communities can provide important and practical support to those who plan to settle in Canada and want to find a job there. Muxlim²³ is an example of culturally-based community that aims to connect the Muslim communities with each other and the wider world, through shared online experiences. The site aims to give people the opportunity to enhance the Muslim lifestyle, as a wider concept than just the religion, as part of a diverse, all-inclusive world, and the community welcomes people of all faiths and backgrounds.

Topic-based learning support. Some platforms have been created to help people learn about a specific topic with peers and with different types of resources. LiveMocha²⁴ is a community that enables language learners and native speakers to connect with each other to learn languages in interaction. It also provides language learning resources. Biology Online²⁵ gathers individual contributions to build a space with learning materials, glossaries and forums on biology-related topics. OneDidIt²⁶ aims to improve learning and ecological awareness by supporting individual and group activities. It provides information on calculating natural resource consumption, tips to improve eco-efficiency and a means of following one's own progress. Furthermore, the site enables participants to team up with friends, work colleagues, or neighbours, to compare results and create their own communities for saving natural resources.

4.3 SOCIALLY-ORIENTED PARTICIPATION

New tools, technologies and the Internet allow people from different places to gather online at the same time to interact, play and entertain in real-time with each other. Socially-oriented participation arises from people's need to express and to connect with others, without necessarily relating to certain work objectives, topics or joint contexts, although people's offline ties are often also visible online (Cachia, 2008). Typically, platforms allow different interaction, commenting and discussion facilities, as well as setting up groups, which enable users to dynamically create networks and communities.

²¹ <http://www.veganitalia.com/>

²² <http://loonlounge.com/>

²³ <http://muxlim.com/>

²⁴ <http://www.livemocha.com/>

²⁵ <http://www.biology-online.org/>

²⁶ <http://onedidit.com/>

4.3.1 Connecting through expression

Social media platforms provide channels for sharing expressions and connecting with other people through them. Although the creative contributions are often individual, they may be a form of interaction, and, furthermore, often lead to discussions in the related commenting facilities.

Media sharing spaces. Different media sharing opportunities allow new networking to appear in the form of discussion, commenting, linking and recommending the content shared. YouTube is an example of a major media sharing platform, with 200 million unique users each month and the 6th largest audience on the Internet (based on Nielsen/NetRatings, March 2008).²⁷ YouTube contains citizen journalism videos documenting war scenes in Iraq, natural disasters, or local issues²⁸ as well as several university channels.²⁹ The EuTube channel had over 1 million hits in less than three months³⁰ and in the US, CNN and YouTube enabled people to prepare and present questions for the presidential TV debate in 2008. It has been shown that in video sharing communities, amateur videos themselves, combined with related discussions, comprise a form of interpersonal communication (Kendall, 2008). However, Cardon & Aquiton (2007) showed that the opportunity for personal publishing may be dominant in media sharing environments, as their extraction from all Flickr accounts showed that only 19% of Flickr users use the cooperative functionality of the Flickr service to monitor different contacts, bring their photos in thematic groups or to tag photos. Online Computer Library Center (2007) found that the top motivations for participating in social media were: “The website is fun” (47%) and “The website is useful” (33%). Young respondents appreciated the enjoyment more and older respondents appreciated the usefulness aspect more. For all respondents, the fact that friends were using the site was one of the most common motivations, showing that usage is very much related to social networking.

Blogosphere. Though blogs are personal, they are often also public online spaces for writing and expression, which enable others to comment and link with their blogs. Incrementally building discussions and linking blogs with each other is typical in the blogosphere. Bloggers produce content in order to reach others and to start conversations – when a blog has no comments, the blogger often stops producing on a regular basis (Mishne & Glance, 2006, cited in Cardon & Aquiton, 2007). Bloggers may use more time in replying to comments than editing their own posts (Cardon & Aquiton, 2007). A survey of US bloggers showed that 52% write for themselves and 32% for an audience (Lenhart & Fox, 2006). The reasons (either major or minor) for blogging were creative expression (77%), sharing personal experiences (76%), and sharing practical knowledge (64%). Cardon & Aquiton (2007) suggest that there are four types of relational networks in the blogosphere, distinguished by the size of the network, connectivity between commentators and the presence of known or unknown contacts. In thematic blogs, people enlarge their social networks by using blogs to discover new people that have the same skills or tastes. They mix in their contact network people they already know and people they will encounter. In blogs concerned with information and politics, bloggers gather in clusters of similar points of view, but also comment on others.

4.3.2 Social online platforms and activities

Social online platforms provide opportunities for individuals to participate, form links with others and form communities by joining together for a joint activity, for shorter or longer periods. Often the socialisation platforms provide opportunities to create subcommunities around certain interests, or form groups, e.g. in a virtual or game world, in order to work towards common goals. Therefore, socialisation and many online facilities built for it, often provide for topic-based and task-based participation motivations as well.

²⁷ as stated in <http://www.youtube.com/t/advertising> , 30th May 2008

²⁸ http://www.youtube.com/view_play_list?p=C281AA726C624F40

²⁹ 1,140 university channels could be found in YouTube in February 2009

³⁰ See:

<http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1498&format=HTML&aged=1&language=EN&guiLanguage=en>

Online social networks. Peer influence is an important factor for participating in online social networking. 66% of social networking users state that (one of) their motivation(s) for using the site is that their friends use the same site (OCLC, 2007). Among respondents aged from 14 to 21, this was the most common motivation (80%), while among respondents aged 50 ++, the motivation “to be part of a group or community” scored the highest (42%). For young people especially, online networking is a normal tool for managing their lives. A survey of 354 US undergraduates showed that 62% of them logged into MySpace or Facebook at least once a day, if not more (Vie, 2008). These students used online social networking sites in multiple ways: to share class notes and ask questions about homework; to find old friends and make new ones; to keep tabs on significant others; and to track the latest trends in music, movies, and viral videos. Even those students who chose not to participate in these sites acknowledged the profound influence of MySpace and Facebook on college students’ lives. Conole et al. (2008) found that students are very advanced in using internet technologies to find, manage and create resources, drawing on peer networks and appropriating technologies to meet their personal needs, intermingling learning with social and leisure activities.

Entertainment. Video gaming is a highly pervasive activity for young people, as over 90% of teenagers play games (Lenhart et al. 2008b). Gaming is often a social experience, and teenagers who take part in social interactions related to a game, such as commenting on websites or contributing to discussion boards, are also more engaged in civic and political activities. 76% of teenagers at least sometimes help and guide other players and 27% do so often (Lenhart et al., 2008b). In addition to gaming, other forms of online entertainment also exist. Aarreniemi-Jokipielto (2007) presents the case of an afternoon club service on television for schoolchildren from the ages of 9 to 11. This club provides the children with a safe option for lonely afternoons. Children can participate with instant messages during a programme, forming a reciprocal community of users. The messaging was characterised by commenting on a subject and answering questions. The children made the rules for what was allowed in Instant Messaging (IM). They felt that messages that included swearing and abuse should be rejected; half of them felt that messaging that were off-topic should also be rejected. A student stated that “if there are no rules, the messaging will be general communication and communication will be off-topic.” Aarreniemi-Jokipielto concludes that the purpose of a user or a user group affects IM utility, but it also affects the community and programme. If the purpose is educational and goal-directed, it affects participation, tasking, and policy, and may need a moderator.

4.4 PARTICIPATION WITHIN AND ACROSS ORGANISATIONS

Many online platforms and networks are established by organisations, such as educational institutions or workplaces. These closed networks and online platforms are often used as working tools, e.g. for courses at a university, workgroups at companies, or as interaction mechanisms for cross-organisational activities. These can be set up for either a restricted group or the whole organisation. These platforms and networks may function as instruments for working teams and tasks and, at the same time, facilitate individual social integration and enable the development of communities where members are committed to and engaged in sharing and creating expertise.

4.4.1 Online environments in educational institutions

Educational institutions are setting up online platforms for sharing information, enabling communication and supporting collaboration of their students and staff. These are sometimes referred to as virtual communities, and are used as learning settings for courses. They can be either closed community environments or they can provide participants with the means to learn by participating in other communities. Community tools can also be set up with a view to supporting students in integrating their educational life with other activities.

Community model within courses. Educational institutions are already experimenting with ICT-enabled collaboration in order to enhance the reach, settings, processes and results of education and learning (Redecker, 2009). Even without the online aspect, it has been suggested that one of the

strongest determinants of students' success in higher education—more important than the details of their instructors' teaching styles—is their ability to form or participate in small study groups (Light, 2001, cited in Brown & Adler, 2008). Light found that students, who studied in groups, even only once a week, were more engaged in their studies, were better prepared for class, and learned significantly more than students who worked on their own. Initially students may perceive low value for knowledge sharing and trust in the online community, but after using the platform set for the community, they perceive high levels of value (Thoms et al., 2008). Furthermore, online community settings can provide a learning support group for people participating from different locations and settings, and hence enable part-time workers to participate in courses. They can also provide the means for students to enrich their curricula by participating in courses provided by other institutes. In this case, the online networking provides interaction opportunities when face to face interaction is not possible.

Learning by participating in communities. Lin & Zini (2008) described bridging a local knowledge-sharing and learning community with the global Internet society through using open source software in the educational environment. Apart from using the software for learning Italian synonyms, the students also contributed to the tool's Italian thesaurus and gave feedback on the software, hence participating in the global software development community. Regan & Zuern (2000) reported an experiment where community-service learning projects were used to further pedagogical goals for technology-intensive writing classes. Students acquired writing and web page development skills through composing for real audiences, and gained valuable experience in teaching people whose life experiences, levels of literacy, and exposure to technology were different from their own. Working with community members enabled students to fill previously unmet needs and provided them with concrete examples of disparities that might otherwise remain abstractions in class discussion. Chisholm (2007) called for the use of virtual community work to address the endemic problems of college campuses where students live without adult guidance. Linking students with outside adult, professional, local and global communities could be part of their learning and growing experience during higher education.

Integrating institutional environment with other resources. Community tools can also be set up with a view to supporting students in integrating their educational life with other activities. Many students already participate in different online communities outside educational institutions, building their resources and connections there. Isolated institutional environments would separate their formal learning activities from their other (also learning related) activities. For example, a recent survey on 1,277 US teenagers showed that 50% of pupils using social networking are discussing schoolwork in the networks (NSBA, 2007). It has even been questioned whether closed Virtual Learning Environments (VLE) make sense in the web2.0 world, since students are discussing their school life and learning on other online social environments anyway (Anderson, 2007). However, there are arguments both for and against individual open Personal Learning Environments with web2.0 tools and closed Learning Management Systems as safe places for learning (Sclater, 2008). Community@Brighton³¹ is an example of a social networking system for students and staff, which allows users also to incorporate material from other social networking platforms such as MySpace. All course cohorts are automatically added as communities, and students and staff are free to create their own communities.

Creating lifelong communities at institutions. Online tools bridging physical and resource boundaries make it also possible for educational institutions to promote peer communities for their members with a lifelong learning perspective. For example, CEDDET³² is a training organisation, which provides courses for professionals and then maintains thematic expert networks with organised knowledge sharing activities for the former course participants. In these communities, experts can continue their networking and knowledge exchange, and also receive information of relevant short courses available. LTEver³³ at the University of Florence supports community formation with a lifelong learning perspective, by bringing together students and alumni interested in continuing self-training in an online

³¹ <http://community.brighton.ac.uk/>

³² <http://www.ceddet.org/>

³³ <http://www.lte-unifi.net/elgg/>

community by providing students, alumni, teachers and collaborators with their own personal space and platform facilities for free (Calvani et al., 2007). This approach provides concrete tools for students to build resources, connections and communities during their formal education which can then be maintained and updated throughout their lives.

4.4.2 Workplace communities

Tynjälä (2008) reviews recent research on workplace learning and concludes that: (1) the nature of workplace learning is both different from and similar to school learning; (2) learning in the workplace can be described at different levels, ranging from the individual to the network and region; (3) workplace learning is both informal and formal; and (4) workplaces differ a lot in how they support learning. The literature often explores communities of practice for professional and workplace learning, as these are seen as suitable for sharing knowledge, capturing experiences, reusing them, creating new knowledge, and recognising and solving workplace problems, in a process-oriented, collaborative manner – unlike learning approaches which emphasize the transfer of codified knowledge (Hara & Hew, 2006).

Informal learning with informal interaction. Informal learning is a very important, and even the most common form of learning in the workplace, which happens as a result of learning opportunities in the job, in the workplace itself and by executing work tasks (e.g. Cross, 2006; Tynjälä, 2008). ICT tools for communications are frequently used for this learning (Attwell, 2007) – for example, informal instant messaging has been found to improve productivity, by supporting workplace activity and reinforcing the social “glue” that ties people together (Aarreniemi-Jokipelto, 2007). These opportunities allow workers to learn from their work and to learn as they work. This learning is a ‘side effect’ of working and what workers learn and how they learn in this way remains, to some extent, unconscious. Hence, one type of ‘learning ’community’ in the workplaces is the general interaction community, as in the strong common context the participants share, they frequently exchange information relating to common tasks of interest and learn from each other.

Dynamic knowledge management networks. Social computing applications support the above mentioned informal interaction, knowledge sharing and learning in new ways at workplaces and in organisations. For example, IBM and Oracle have published enterprise suites including wikis, blogs and other networking tools.³⁴ IBM declares that their employees have an internal blogging central and a possibility for social bookmarking, both of which support knowledge sharing in new ways. Although only 1% of employees create shared bookmarks, everybody can use the existing 24,000 shared bookmarks, which “often prove to give better matches than the search engine” (IBM, 2007). Majchrzak et al (2006) reported on a workplace wiki, in which the employees participate, in order to enhance their reputations, help the organisation to improve its processes, and because they find it useful for themselves. Allen & Overy is an example of an international law firm, which implemented an internal knowledge management system through social computing tools that enables informal knowledge sharing through social bookmarking, group tags, group blogs, and group newsfeeds. According to Osimo's (2008) case study, this helped users to share tacit knowledge, understand who does what, and facilitated the learning process of newcomers. Participation was often driven by the desire for recognition.

Learning for workplace culture. Gray (2004) presented experiences of the coordinators of the Alberta Community Adult Learning Councils who participated in an online community of practice designed to support informal workplace learning. Through active participation and peripheral “lurking”, newcomers were inducted in the skills and culture of the practice, and, at the same time, experienced practitioners gained new insights into their own professional identities and the meaning of their work. Telling their stories helped to develop the identity of individual practitioners and to reconstruct the identity of the collective community on an ongoing basis. Motivations to participate included an opportunity to learn new skills and work practices, a means of social and professional connection to

³⁴ For example, IBM Lotus Connections, Oracle Enterprise 2.0.

colleagues, and a mechanism to reduce the isolation that was inherent in the job function and geographical location. The role of the online moderator was identified as critical in sustaining the online community over an extended period and enhancing the learning function. Haythornthwaite (2008) pointed out that, of the most common interactions that sustained a workplace community, none may be direct knowledge exchange relations but instead they are about 1) the management of work processes (receiving and giving work), 2) major work products of the group (collaborative writing and computer programming), and 3) socio-emotional interaction and support (sociability and major emotional support).

4.4.3 Communities for learning practitioners

Communities that may support learning practitioners in their work and professional development are of special interest for this study, as teachers play a key role in changing teaching practices and approaches in education and training systems. Examples show that learning practitioners can connect and are connecting with each other and with other people through different types of online activities.

Training environment for educators. Allan and Lewis (2006) studied the impact of a virtual learning community (VLC) on individual learning careers and professional identities beyond the life of the community on a course for university staff. The findings suggest that through engaging in a VLC, individuals may change their 'horizons of action', i.e. consider new learning and career trajectories, and even make significant changes to their lives. There was evidence that the process of exploring and evaluating potential roles, and adopting new identities was taking place, particularly with learners who were at the early stages in their careers. They highlighted the importance of the learning community in providing a safe place, a comfort zone, from which they could develop and change. During the interviews 4 years later, many members stated that they still felt part of this VLC and were in regular contact with each other via email. Hodginson-Williams et al. (2008) described a community which emerged as teachers and students at the university actively collaborated with secondary schools in developing practices for implementing pedagogical approaches with ICT. The community used wikis, mailing lists and meetings to develop their knowledge and practices, giving lecturers and students opportunities for extending the boundaries of their learning experiences.

Educational resource development. There are several initiatives where educators develop resources for education collaboratively. Connexions,³⁵ Wikiversity,³⁶ and OpenLearn Labspace³⁷ are examples of initiatives where teachers, students, and all internet users can create, improve, comment on materials and discuss them with each other. There are also repositories of Open Educational Resources (OER) without open collaborative development, but published by the institutions (see OpenCourseWare³⁸ consortium). OLnet³⁹ has been launched recently and aims to build a global network that creates closer links between people researching, producing and using the OER, in order to facilitate better transfers of good practice and reuse of materials. Educators can also participate in collaborative tool development in tool development communities. Moodle⁴⁰ is an example of a Learning Management System that has been developed as open source software and invites users to contribute through discussion, feedback, documentation and testing. This gives teachers an opportunity to be part of the development team of the tools they use for their courses.

Teacher networking communities. Several websites are gathering learning practitioners together for discussing professional topics. Typically, they also provide networking facilities to connect participants with peers. At the same time, generic social networking platforms allow teacher sub-communities to emerge. Networking, emotional support and sharing knowledge are intertwined among

³⁵ <http://cnx.org/>

³⁶ <http://www.wikiversity.org/>

³⁷ <http://labspace.open.ac.uk/>

³⁸ <http://www.ocwconsortium.org/>

³⁹ <http://olnet.org/>

⁴⁰ <http://www.moodle.org/>

peers in similar contexts. The Classroom 2.0 site,⁴¹ for example, is a social networking site for teachers, which offers help and advice with online tools, discussion forums and other opportunities to exchange views and experiences. It also offers access to web 2.0 tools for learning. Cloudworks⁴² is another example of a site for sharing learning and teaching ideas and connecting educators. There are also online communities around teaching tools, such as whiteboards⁴³ or virtual worlds,⁴⁴ or on teaching topics. For example, Talkabout Primary MFL⁴⁵ is a social network run on Ning for people teaching, or considering teaching, foreign languages in primary school. It is a place to share worries and successes with supportive colleagues. The German “Lehrerforum”⁴⁶ uses a forum-approach to build a network of peer support around common – often social, psychological or legal – problems encountered by teachers in their daily lives.

4.5 DISCUSSION

There is a great number and variety of networks and communities emerging with social computing and other internet-based applications. This chapter gave examples of different types of initiatives, approaching them through the major drivers for participation, which we suggest are: joint task, common interest/situation, and social connection. Communities may be set up by organisations or emerge bottom-up, whether inside organisations or horizontally in an open manner. Examples of these communities also exist for learning practitioners, with potential to support their personal and professional development.

Table 1 compares rules, roles and tools affecting the activities of individuals and the collective in different settings. As mentioned at the beginning of this chapter, networks and communities can support different types of participation, but may emphasize some aspect more than others. Similar ICT tools are often used in all settings, although in those which have clear focus and strong connections between members (e.g. professional communities), even simple technology such as mailing lists may be enough to create a beneficial community of practitioners (Hew & Hara, 2008). In task and production based networks, the tools aim to enable efficient collaborative or co-operative work, while in socially-oriented networking tools link users with others of their choice. Sometimes topic-based networks and communities use these features as well, in order to support their members better in exchanging their experiences and building new knowledge. Organisations that aim to set up networks or communities often combine various tools into integrated platforms or enterprise suites in order to support the communication and tasks necessary for the objectives set.

Table 1 : Features relating to different types of network and community participation

| | Task/production-based | Topic-based | Socially oriented |
|------------------------|---|---|--|
| Rules | Comprehensive rules which are often dynamically developed by the community for the production purpose | Rules set up by platform/community, but members may be able to affect their development | Platforms limit and afford activities for individuals, overall user policies, sub-communities can create their own (implicit) policies |
| Labour division | Dynamically developing roles, depending on the member's skills and effort acknowledged by the community | Both explicit managers, and dynamically emerging leaders based on individuals' decisions. | No formal roles, but possibly self-declared responsibilities which are accepted by the surrounding group. |
| Tools used | Collaborative work tools: wikis, resource management | Interaction tools: Mailing lists, discussion forums, repository spaces | Sharing and linking platforms: personal profile and resource spaces, message feeds, user linking, groups |

⁴¹ <http://www.classroom20.com/>

⁴² <http://cloudworks.ac.uk/>

⁴³ For example, <http://www.interactivewhiteboardlessons.org/>

⁴⁴ See, for example, <http://www.rezed.org/>

⁴⁵ <http://primarymfl.ning.com/>

⁴⁶ <http://www.lehrerforum.de/>

Table 2 gathers together some of the motivations for participating in different types of communities. Summarising the participation motivation factors shows that there are both extrinsic and intrinsic motivations for all types of communities. This further diversifies the memberships of the communities, as not only those with internal desire to participate do so, but also different external aspects can affect the participation. Furthermore, originally extrinsic motivation may become more intrinsic after active engagement in the community. As discussed by Cardon and Aquitton (2007), users do not always have an explicit or clear plan of action, goals may be less defined, and more flexible and pragmatic, and then change when users begin to get more involved and active. According to these authors, the success of web2.0 services demonstrates users' hybrid motivations where the individualisation of the users' goals meets the opportunity of sharing personal expression in a public sphere.

Table 2 : Examples of participation motivations in different online communities

| Motivation to participate | Task/production-based | Topic-based | Socially oriented |
|--|---|---|---|
| Usefulness | FLOSS (Lakhani & Wolf, 2005), Workplace wiki (Majchrzak et al (2006) | Professional communities (King Research, 2007) | Social media (OCLC, 2008) |
| Connecting, avoiding isolation | | Immigrants (Maya-Jariego et al. 2009) ; Professional communities (Gray, 2004) | Social networking (OCLC, 2008) |
| Contributing to common good, reciprocity | FLOSS (Lakhani & Wolf, 2005); Workplace wiki (Majchrzak et al., 2006) | Professional communities (Hew & Hara, 2008) | Blogs (Lenhart & Madden, 2006) |
| Get fame, recognition | Workplace wiki communities (Majchrzak et al., 2006; Osimo, 2008 | | Social media (Ala-Mutka, 2008) |
| External requirement | FLOSS (Lakhani & Wolf, 2005) | | |
| Because want to learn | FLOSS (Lakhani & Wolf, 2005) | Professional communities (Gray, 2004) | |
| Sharing knowledge and experiences | | Professional communities (Hew & Hara, 2008) | Social media (OCLC, 2008) Blogs (Lenhart & Madden, 2006) |
| Because it is fun, enjoyable | FLOSS (Lakhani & Wolf, 2005) | | Social networking, social media, gaming (OCLC, 2008) |
| Because friends do so | | | Social networking, social media (OCLC, 2008) |
| Because want to express, create | | | Blogs (Lenhart & Madden, 2006), Social Media (OCLC, 2008) |

The participation motivations reported are not dominated by an explicit desire to learn, although some examples of work and skill related communities show this motivation as well (Gray, 2004; Lakhani & Wolf, 2005). However, the literature suggests that people experience learning in these communities, even though learning may not originally have been their main motivation for participating. The next chapter will discuss how communities can support learning in ways that often differ from traditional classroom settings.

5 INNOVATIONS FOR LEARNING IN ONLINE COMMUNITIES

Connecting with others and participating in online communities provides important emotional and cognitive support for learning, not only compensating for face-to-face interaction or increasing access to information resources but increasing effectiveness and allowing personalisation of learning in new ways. This chapter reviews the innovative aspects of learning in communities, concentrating on issues that differ from traditional classroom based learning situations.

The approach for reviewing learning innovations follows the dimensions for learning in online communities as discussed in Chapter 3: cognitive, social and organizational aspects for the learning process.

5.1 DIFFERENT WAYS FOR MEANING MAKING

As discussed in the previous chapter, even though learning may not be the main goal of participation, literature suggests many ways in which online networks and communities can support learning and meaning-making processes of their participants. These are often ways which differ from traditional instructional approaches.

Learning through narratives. As emphasized by Bruner (1996), narratives are a powerful way of learning, providing a means to situate oneself in the culture and make meaning. Mayer (2003) found that conversational narratives combined with animations contributed to a personalisation effect, where the students developed significantly more creative solutions than through conventional instruction and explanations. Sharing knowledge and experiences is a major motivator for participating in social networking and social media (OCLC, 2007), leading to many narratives being developed and shared continuously. Lenhart & Fox (2006) found that among bloggers, 76% wanted to document and share their experiences. Gray (2004) reports that in the professional community, telling their stories helped people to develop their own and collective identity as practitioners. Carbonaro et al. (2008) suggest that multimedia storytelling allowed students to engage in learning by design, inquiry-based lessons, and meaning-making activities, and to reflect upon the resulting interactive stories in a larger community.

New opportunities for reflection. Reflecting on existing knowledge and new, possibly contradictory information and situations is an important source of learning, and online communities provide a large variety of opportunities for it. Park et al. (2008) found that 25% of the adults participating in online social networking believed that the online profile-related activities lead them to reflection and meaning-making processes. Social media can enable active reflection, for authors, readers, and participants in related discussions. As pointed out by Cardon & Aquiton (2007), bloggers, for example, are encouraged by and actively engaged with the comments on their blogs. Also virtual worlds and 3D environments afford opportunities for exploring identity and engaging in reflection and discussion about personal and moral values (Bers, 2001). For example, Lenhart et al. (2008b) found that when gaming, 52% of teenagers said that they had thought about moral issues.

Inquiry-based learning. The vast amount of online resources supports inquiry-based learning due to either intrinsic or extrinsic motivations, as internet users can easily search and connect with resources (different types of materials, discussion forums or people) on any specific topic. This supports progressing in one's learning according to one's own interests, but with the social support of the other individuals and communities. Global communities make it possible to quickly connect with someone to ask for advice.⁴⁷ This connective aspect has been used also to connect real-world issues with organised education. For example, Doering (2007) describes an adventure learning project that connected students to explorers and researchers participating in a trans-Arctic dogsled expedition,

⁴⁷ An example of the educative responsiveness of a global community: In the World of Warcraft game community, novices get the first answer to their question on average in 32 seconds, and the community culture is to educate novices into the rules and ethos of the game environment (Nardi et al., 2007).

providing students with opportunities to explore real-world issues through authentic learning experiences. The teachers involved considered that the approach provided K-12 classrooms with online dialogue and collaboration opportunities, inquiry-based curriculum with authentic real-time content, and motivation for inquiry through multiple modes of media.

Experiential learning. Online communities with joint activities provide places for learning through concrete or simulated experiences. Collaborative production communities such as Wikipedia or open source software communities take care that all members follow the rules and guidelines of the community, hence guiding them to learn the community production principles in context while participating in the activities. Nardi et al. (2007) examined learning culture in a popular online game, World of Warcraft, and found that learning followed the model of the zone of proximal development and the learning conversations were filled with drama, humour, and intimacy. Chat conversation is a key means of learning in World of Warcraft but not the only means, as players learn also using player-created content, simply by playing, and observing other players, learning from their successes and failures. According to Nardi et al., players pick up astonishingly detailed information relating to World of Warcraft through conversation in an event-driven, spontaneous, erratic, serendipitous, and contextual fashion, accomplishing more with the aid of experienced peers than they could on their own.

5.2 DIFFERENT SOCIAL CONTEXTS

Online communities provide large networked environments for learning with different socially supporting elements. Benkler (2006) brings up the effective, large-scale cooperative efforts for peer production of information, knowledge and cultures as an essential feature of the networked information economy. These also have a positive impact on the practical capacities of individuals, enabling them to do more by and for themselves, in collaboration with others.

Peer support for learning. As opposed to traditional institutional learning settings, online networks encourage collaboration, asking and sharing advice with others. As online communities are often formed around joint contexts, interests and objectives, they provide plenty of peers with whom it is possible to link up with through shared issues. Well-targeted advice from peers or experts to a question can support learning effectively in the context of the specific task. Kester et al. (2007) reviewed that learners who engage in peer tutoring are more satisfied with academic life; they are more intrinsically motivated and more engaged with the learning environment; they perceive their learning experience more positively, and experience less task-related anxiety. Peer tutoring may enhance learning and knowledge construction, and even more so for tutors than for tutees. The co-operative process stimulates reflection; the peer interaction improves self-esteem and commitment to work as well as a sense of belonging (Fantuzzo et al., 1989, cited by Kester et al.). Although these results come from organised settings, the same phenomenon is also applicable to informal communities. For example, Thomas (2005) found that in the case of writers, twinning, mentoring, and partnering seemed to work better than group training.

Environments mixing experts and novices. Traditional school environments gather learners into groups, which are separated from experts in the field. A powerful feature of online communities is that they connect novices and experts to work together on a joint interest, context or objective, as there are simultaneously different tasks which are suitable and interesting for different skills levels, and which support learning and interaction for all participants. Therefore, there are many opportunities to find someone with more experience to ask advice or to follow their example than, for example, in a study group with a limited amount of tutors. Helping novices to learn is often part of the culture of the community (e.g. in Nardi et al (2007)) and may even motivate some experts to participate (Hew & Hara, 2008). Furthermore, Gray (2004) found that in CoPs not only the novices but also the experts learn from the interaction.

Peer recognition of learning. The fluid peripheral to centre movement that symbolises the progression from being a novice to an expert is an essential component that distinguishes CoPs from traditional

organisations and learning situations. Production communities such as Wikipedia and FLOSS communities show that members who show good and active contributions can gain more responsibilities and recognition in the community. In this way, the learning outcomes and skills achieved are acknowledged quickly and rewardingly by the peer community, without waiting or asking for official exams or certifications.

Learning by observing others. Online settings allow people to follow and observe from a distance the activities of a large number of different individuals and a variety of communities, which is often not possible in offline settings. Surveys suggest that, for example, the majority of social computing users are not actively contributing, but reading and following (Pascu, 2008). Dennen (2008b) suggests that lurking is a productive practice for some learners. She suggests that most learners are lurkers at some point in time, reading, invoking meta-cognitive strategies and making their own connections with the material, but not necessarily leaving an indicator on the discussion board that they have done so. Her study showed that about half of the students felt that they learned through the online discussion experience, and that they believed both posting and reading messages contributed to their ability to learn. In an earlier study she found that silent students did indeed engage in learning-related tasks. Holliman and Scanlon (2006) also found evidence of learning among passive participants in cooperative and collaborative groups, with both active and passive participants outperforming non-participants when assessed. Takahashi et al. (2003) found in their study on two mailing list communities large shares of lurkers who never posted messages (83.8% and 51.6%). However, a large share of the members were actually so called 'active lurkers' (44.6% and 36.6%, respectively) who didn't post but propagated information from the community to others, hence were indirect contributors to increasing the influence of the online community on its outside environment.

5.3 NEW WAYS TO ACCESS, ORGANISE AND SUPPORT LEARNING PROCESSES

Online communities provide innovations for educational institutions and organisations in two major ways. First, the existence of online communities and people's active participation in them allows institutions to enrich their learning approaches and on the other hand obliges them to prepare their learners for participation in the external communities for the benefit of their learning and integration in society. Second, the emergence of these communities affects the position and tasks of the traditional educational institutions in relation to their 'customers' and society, as learners are empowered to acquire their skills and also receive recognition outside institutions through social approaches.

Collaboration models as learning settings. Encouraging social knowledge sharing and development, instead of pre-planned knowledge transfer, can support learners building their own identities and developing new relevant knowledge. For example, McAllister & Moyle (2006) describe their curriculum planning to prepare clinical educators for their role in supporting nursing students to develop clinical skills and gain confidence in the practice of nursing. Their course was designed to build an online "learning community" and assessment activities invited critical, creative thinking so that new ways of rethinking clinical education were stimulated, to challenge the status quo and tie educational theory to everyday clinical teaching work. The authors suggested that their course design builds a knowledge-building community developing learners' communal competence, shared identity and aggregated knowledge.

Community as an organisation model. Participative working models in organisations can make the workplace resemble a community, which can dynamically develop based on the learning and innovations of its members, instead of applying (possibly malfunctioning) top-down rules. Based on the project for supporting independent lifelong learners, De Freitas et al. (2006) suggest the community approach also for inter-institutional collaboration. They emphasize the importance of forming partnerships between different learning providers, careers advisors and adult learning organisations in order to offer a more connected, effective and holistic approach to the learner's educational and career needs. Gaps in provision can provide significant stumbling blocks for career

progression and successful lifelong learning pathways; through working together as a community, it is more likely that these gaps can be avoided.

Linking with and benefiting from the communities. The emergence of different online communities provides an opportunity for institutions to connect with and benefit from resources outside their walls. Targeted community collaborations can provide educational institutions with the potential to enrich their learning provision. As these communities and networks are part of the daily life of the students outside school hours and after formal education, including learning to participate in them, virtual visits to professional communities etc. could enrich the learning outcomes on the courses and prepare the learners for life outside the institutional environment. Furthermore, networking and sharing between teachers can provide institutions with better motivated and skilled actors, equipped with a much larger variety of resources than would be possible within the institute. Opening up institutional resource development and research enables the reception of input from a larger variety of experts. Furthermore, they can provide channels for the learners and general public to raise their viewpoints and suggestions, bridging researchers, practitioners, and learners, as aimed e.g. with OLnet.⁴⁸

Empowered learner client. Opening up access to learning materials of courses and open educational resources in general can benefit users both inside and outside learning institutions. New opportunities for creating, finding, organising and connecting with learning opportunities allow for the building of personalised lifelong learning paths, connecting learning from different sources as needed. This can support developing learning based on the individual's knowledge and interest, facilitating personal creativity. As learning materials for degrees and courses are increasingly online, students are better informed when they choose their field of interest and training provider. Or they might select to participate and learn in informal professional communities.

5.4 AFFORDANCES OF TECHNOLOGIES

Recently emerged technologies and especially social software have expanded the tools and audience for personal and social creativity. Furthermore, many of the pedagogical, social and organisational innovations are essentially enabled with the new connectivity and information management opportunities of ICT. Gibson (1979) created a term 'affordances' to discuss what actions an environment makes possible for an actor (animal or person), taking into account the capabilities of the actor, as a relationship independent of desire or recognition of the action's possibility. Norman (1999) developed the concept of 'perceived affordances' in relation to computer technologies, emphasizing actions that users perceive to be possible with the interfaces available, taking into account their personal understandings and objectives. This section discusses the affordances of ICT for online networking and collaboration from this point of view. The discussion is not on the human-computer interface level, but on a more general level on the ways in which ICT can be seen. There is evidence showing that technologies can afford learning for the people participating in online networks and communities.

5.4.1 Enhancing learning and creativity

ICT enhancing creative expression. Multimedia opportunities and the great availability of resources and connections can help individuals to imagine, make new connections, ideas and creations through drafting and exploring (Loveless, 2007). Carbonaro et al. (2008) describe an environment for interactive storytelling with multimedia, showing that students can successfully construct sophisticated interactive stories with very little training. ICT offers the possibility to try out lots of ideas, revise and make choices when seeing the work in progress and to be able to discard or edit it easily (Loveless et al., 2006). Real practice situations can be easily captured with current tools; camera phone, digital camera, screen capture utility, PC camera, and so forth. This makes it easy and fun to share experiences and knowledge online (Han et al., 2007). Social networking and other online community

⁴⁸ <http://olnet.org/>

platforms often provide easy tools to build profiles to express and develop personal identity in collaboration with others.

Improving learning effectiveness with multimedia. Multimedia learning occurs when students build mental representations from different media sources such as words and pictures (e.g., printed text and illustrations or narration and animation). Students can learn in greater depth from well-designed multimedia messages than from more traditional modes of communication involving words alone (Mayer, 2003). This requires good visual and information design, combined with pedagogical design. Grimshaw et al. (2007) reported on a study on children's comprehension and enjoyment of storybooks according to the medium of presentation. Beneficial effects of ICT were demonstrated as the provision of narration in the electronic version of a book led to significantly higher comprehension scores than when narration was absent. Medium did not affect enjoyment of a storybook. Najjar's review (Najjar, 1996) suggested, furthermore, that multimedia information is more effective for learners with a low level of prior knowledge in the domain being learned. When learners try to construct new knowledge or concepts of which they are ignorant, the visualisation of the knowledge structure is very effective in helping learners understand and memorise the knowledge.

Immersive environments. Virtual world technologies can facilitate immersive learning experiences in collaborative environments. These kinds of environments are often created for a specific group, and in organised learning settings. For example Miao (2004) presented a web-based, multiuser, 3D simulation learning environment for learning to drive within virtual communities. The goal was to help geographically distributed learners to acquire and construct knowledge by doing shared "authentic" activities, to interact with each other as community members, and to undertake informal, unstructured, spontaneous, and situation-oriented learning. There are also open virtual environments allowing communities to form, Second Life being the largest and best known of them. It allows the user to innovate and create objects, enabling learning through design and experimentation. Lee & Hoadley (2007) reported how students, after participating in immersive online game environments on course tasks by assuming alternate identities, changing their gender, age, or ethnicity, demonstrated a new sense of empowerment and a greater sophistication in understanding other cultures and technology.

Game-based learning. The category of 'serious games' is used when talking about games which have a purpose to train, educate and inform. Pew/Internet (Lenhart et al, 2008b) conclude that civic games offer a more equally distributed learning opportunity for teenagers than many other civic learning opportunities. Games can be developed so that the content to be learned is blurred with game characteristics, e.g. problems are part of the game and players are motivated to seek knowledge to provide a solution in order to continue with the game (Pivec, 2007). Hence, games can use the intrinsic motivation of the player to explore the game world, which includes learning activities and communicating with other players. The immersive environment of game worlds can be perceived as a very motivating and emotionally positive place for learning, as studied by Nardi et al. (2007). Furthermore, players can get so motivated by the current game they play that they explore related background knowledge and context.

5.4.2 Supporting sociability

Showing and experiencing presence. Current technologies support different ways to create a sense of connection between people over physical distance. Community platforms often show presence information in forms of visible symbols, display status messages and support instant messaging in different forms. Contreras-Castillo et al. (2004) found that with a course system, which showed presence information and supported informal messaging between people present in the system, students felt less isolated and collaboration among course participants was increased. 74% of students logged into the system quite often to check who else was connected, 67% considered that awareness of others connected to the web site at the same time made them feel accompanied while navigating through course materials and 60% reported that being aware of the presence of others made them feel part of the group attending the same class.

Networking tools. Social networking tools afford various ways to create and maintain links with other people and create groups. For interacting and networking, it is essential to establish one's voice and identity (Hodgson, 2008), and tools for creating personal profiles support this by enabling personal creativity. Profile information can be used to find and follow the activities and knowledge of others, making it possible to find people to ask for or offer advice. Different experimental approaches also exist for improving the matching of peers for asking and giving advice. For example, Van Rosmalen et al., (2006); and Kester et al., (2007) developed a concept of ad hoc, transient communities to describe how peers join ad hoc to ask and solve a request, and developed a system to match suitable peers for tutors depending on the nature of the request.

Collaboration tools. Collaborative working tools in internet environment provide important support for communities. Discussion, commenting and creation facilities, material and member management, organisational support tools, all of these afford crucial activities for productive collaboration. Although literature suggests that viable professional communities for learning can exist with a simple mailing list approach (Hew & Hara, 2008), production communities in particular, such as Wikipedia or open source software communities, rely heavily on the collaborative technologies which provide (and shape) their working model.

Gathering and making tacit knowledge explicit. Current technologies are providing new ways to make tacit knowledge visible, i.e. explicit, by gathering and showing information relating to people's actions. Systems for storing, sharing and viewing bookmarks afford new ways for learning from other people's activities, without necessarily having links with these people themselves. Resource platforms can gather and show information on the popularity of resources, giving previously invisible information about how many other people have decided to select this resource among all others. Online libraries and journal databases are collecting information on the readers' behaviour and are able to provide new targeted suggestions for related readings, based on the users' viewing behaviour. Similar approaches could be applied also to communities, to benefit from the attention information of peers. StumbleUpon⁴⁹ is an example of a system that suggests resources based on the ratings coming from three levels: oneself, one's groups and the overall internet audience. These create social filtering systems that help to follow and find resources that have been considered valuable by peers. As the amount of information available is continuously increasing, these filterings are very important for dealing with information overload and finding relevant materials, and have been found useful in a work context (IBM, 2007).

5.4.3 New ways for accessing, organising and interacting

Easy access to a diversity of resources. The Internet has become a large public library entering the homes of lifelong learners, and filled by many other learners to discuss and learn with, or just to observe. This accessibility to materials and people enables task support and learning when needed. However, information overload is the downside – how to find the best and relevant resources for oneself. As mentioned above, social filtering systems can signal preferences and help in finding resources, but also different technical approaches are being developed. For example, Drachsler et al. (2008) have developed a personal recommendation system that aims to help learners to find the most suitable learning activities taking into account their personal needs and preferences. Zhuge (forthcoming) suggests a system to discover and make use of the semantic communities and the emerging semantic relations in the complex network of internet resources, in order to better match the learners to the resources they need.

New ways for participating. Emerging technologies are providing new tools and channels for learning interaction and resources. The examples above have already presented for instance IM community approaches through television, and another widely visible example is the increasing popularity of mobile technologies as a tool for participating in social computing approaches (Pascu, 2008). Rey-Lopez et al. (2007) present their model of integrating educational opportunities to TV programmes,

⁴⁹ <http://www.stumbleupon.com/aboutus/>

providing personalised learning experiences. Different tools and interfaces for accessing are important for people with less familiarity with technologies or no opportunity for broadband connection. For example, older people may be more interested in learning through digital television than through computers (Ala-Mutka et al, 2008). Second Life shows that an ICT-enabled environment can empower people who might be restricted by their physical environments. For example, Tateru Nino, who is autistic, describes how after a series of disappointing job and social encounters in real life, in the Second Life environment he can communicate more easily with other people, and has actually become a celebrity and discovered that he was not the person he had practically already resigned himself to be.⁵⁰

Lifelong personal knowledge management. Technologies support both accessing resources and people, and building different types of links to them. RSS and Atom technologies allow selected developments to be followed, and social bookmarking, blogs, and profile building allow the gathering of resources together. Integrating platforms make it possible to gather and follow activities in many other places at the same time. Altogether these can form a lifelong personal knowledge management environment, developing as needed. No easy user-friendly integrating solutions for gathering all different aspects together exist yet, but people are appropriating technologies for this purpose in their own way, as shown for example by higher education students gathering networks and resources for personal knowledge management via blogs (Baggetun & Wasson, 2006). LTEver⁵¹ is an example of an institutionally provided platform, to which students could add resources during their time as university students and which they can keep using, updating and enriching throughout their lives, and stay in touch with their contact networks on the same platform.

5.5 DISCUSSION

Online communities provide different innovative aspects that have the potential to enhance lifelong learning. They provide i) different ways for meaning making , ii) new social environments for learning, and iii) new ways to access and organise learning . Some of these have already been experimented as innovative approaches in formal and non-formal education. ICT is crucial for online communities, already simply for their existence. However, technologies provide many specific affordances for learning in networks and communities, by giving new ways to launch reflection, experience social support and organise learning. Figure 8 gathers together aspects discussed in this chapter.

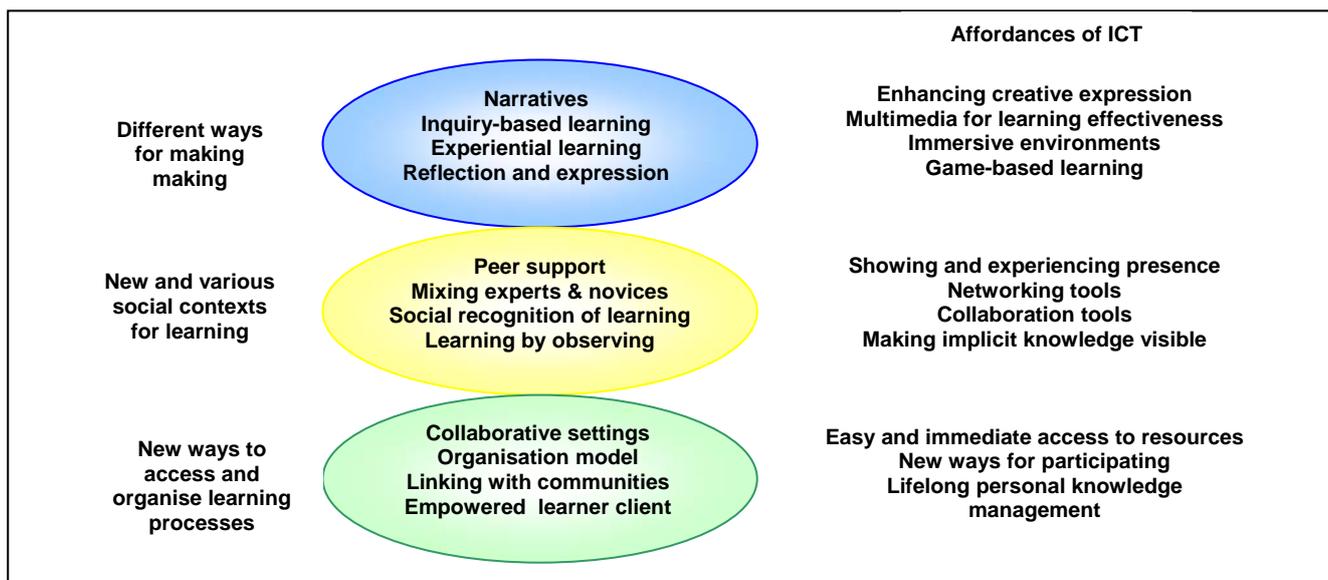


Figure 8 : Innovations and ICT for learning in online communities

⁵⁰ http://www.marketingfacts.nl/berichten/second_life_inside/

⁵¹ <http://www.lte-unifi.net/elgg/>

Lai et al. (2006) suggest a major challenge for online communities of practice is that it is not known whether tacit knowledge can be learned in them. We suggest that in the communities where peers, novices and experts work together in a joint production (e.g. Wikipedia, Open source software), this collaboration reveals and also gives an opportunity to learn different forms of implicit and tacit knowledge by observing how others work. Furthermore, technological solutions for knowledge management and sharing make it possible to make implicit and tacit knowledge visible and explicit in new ways, as online activities can be recorded and used to generate guiding suggestions. However, limitations remain on topics which are completely offline, and online interactions can exchange only knowledge that has become explicit. However, different narratives (e.g. blogs) are also enriching these exchanges, as they may bring up implicit knowledge of the writer without even realising it.

6 LEARNING OUTCOMES AND SUCCESS FACTORS

Learning in online communities emerges in various ways, and is enabled by different resources, tools, roles and activities in the communities. Learning may manifest itself in the artefacts created, or in shaping the participation activities, interactions and discussions. This chapter first reviews the learning outcomes that can be promoted in a community. Then, the chapter discusses different success factors supporting individual learning in the community.

6.1 LEARNING OUTCOMES IN COMMUNITIES: KEY COMPETENCES

As online communities exist on almost any topic, one of the benefits provided for learning is the easy, immediate access to information resources, in various media formats. Furthermore, it is not only resource materials but people that can be reached, to ask for advice, read their discussions or have a look at their work. If knowing where to look, an answer or advice for almost any question can be found (although the validity of the advice should be critically assessed by the learner, as will be pointed out in the Chapter 7).

In addition to inquiry-led task support and learning, participation in a community in the longer term promotes learning community membership, which may include several types of skills and knowledge relating to the community motive and practices. Hew & Hara (2008) reported how participation in the professional community provided nurses with the opportunity to make more informed decisions about their professional practice and keeping abreast with up-to-date changes in their specialty areas. Bryant et al. (2005) discussed how novice Wikipedia users, in time, became more concerned with the quality of Wikipedia content as a whole, taking on more "administrative" roles in the site. From participating in a community with both experts and novices, individuals can learn from the activities and expressions of others, and the community can learn from the learning of the individuals.

This section shows examples of different types of skills that can be learned in different types of communities. The review is not exhaustive, but aims to illustrate that almost any types of skills can be learned, if a suitable community context is found. The approach follows the recommendation for Key Competences (Communication in one's mother tongue; Communication in foreign languages; Mathematical competence and basic competences in science and technology; Digital competence; Learning to learn; Social and civic competences; Entrepreneurship; and Cultural awareness and expression) by the European Parliament and the Council (2006), starting from the topic-specific, then transversal competences, and finally other important learning outcomes that are supported as well.

6.1.1 Topic-specific key competences

Language skills. The interactional possibilities in the communities support developing communication skills, either in one's mother tongue or in foreign languages, depending on the community scope. Iding & Sjouge (2008) describe the important role of web-based communities in developing intergenerational and intercultural learning on Pacific Islands through communication and storytelling. They describe an initiative which brought about an opportunity for deaf people to participate in their own linguistic community, and also to learn and teach sign language. Many online communities for language learners are emerging, such as LiveMocha,⁵² which can connect people with different languages to learn from each other. An example of an innovative approach for language learning can be found on Flickr (photo sharing platform), where users asked others to help them learn Italian language through pictures and comments, and it became a completely bottom-up created language learning group, which started supporting also other languages.⁵³ Language skills practised online can range from basic profile building skills to literacy analysis, such as the case with Pynchon book annotation wiki (Schroeder & Besten, 2008).

⁵² <http://www.livemocha.com>

⁵³ http://www.flickr.com/groups/learning_italian/

Writing skills. The various textual expression channels online in general, and in communities with peer feedback, support developing writing skills. Having an audience motivates and encourages writing (Lenhart & Fox, 2006; Lenhart et al., 2008a; Cardon & Aquiton, 2007). Half (49%) of teenagers say they enjoy the writing they do outside school “a great deal,” compared with just 17% who enjoy the writing they do for school with a similar intensity (Lenhart et al., 2008a). Teenagers who have blogs, write more outside school and believe more often that writing is essential to later success in life. Teenagers report greater enjoyment of school writing when they have the opportunity to write creatively, and 57% of teenagers believe that when they use computers to write they are more inclined to edit and revise their texts. 78% of teenagers believe that using more computer-based tools to teach writing would improve their writing abilities (Lenhart et al., 2008). Lulu⁵⁴ is an example of a community for developing writing products into publishable books, thereby supporting semi-professionals to develop their writing skills. Specific communities for collaborative critique and improvement exist, for instance, for poetry⁵⁵. Collaboration benefits learning writing, for instance Cavallaro and Tan (2006) found that in an online writing project on a course, online peer collaboration raised substantially the quality of the work.

Mathematic and scientific skills. Mathematic and scientific abilities can be supported by different topic-specific communities or overall sharing communities. For example, Minnesota university professors created 3D animations to illustrate Möbius transformations and uploaded them to YouTube in June 2007 (NMC & Educause, 2008). By March 2009, the clip had been viewed already 1,5 million times. There are wiki communities, for instance, on mathematics,⁵⁶ quantum physics⁵⁷ and sharing and developing science ideas.⁵⁸ Crowd sourcing efforts such as Galaxy Zoo⁵⁹ for classifying galaxies provide learning opportunities for the participants and contribute to global scientific knowledge at the same time. Researchers can write and receive comments, and interact with the general public, on their research through blogs and specific platforms.⁶⁰

Digital competence. Learning ICT skills often takes place in learning by doing or by getting informal assistance from others. As illustrated in Figure 9, 50% of European respondents in 2007 said they learn IT skills by doing and almost as many with informal assistance (Eurostat data). Online communities are helping people to become active members and provide a platform for informal advice, hence they play an important role in promoting contemporary digital skills for communication, expression, participation and collaboration for the purposes of work, leisure and learning. Furthermore, the existence of online communities may be an important motivator for enhancing interest and skills for learning ICT, especially for people interested in maintaining or finding new social connections, such as immigrants (Maya-Jariego et al., 2009), older people (OCLC, 2007) or linguistic minorities (Iding & Skouge, 2008). Here, it needs to be noted that there are critical digital skills relating to internet safety, media literacy, information literacy etc. which are not automatically acquired by internet users (Ala-Mutka et al., 2008b). As this would be a natural (and critical) aspect to learn in connection with using ICT for different purposes, this aspect needs further research and attention.

⁵⁴ <http://www.lulu.com/>

⁵⁵ See, for example, <http://www.everypoet.org/>

⁵⁶ See, for example, <http://math.wikia.com/>

⁵⁷ <http://qwiki.stanford.edu/>

⁵⁸ <http://sharescienceideas.wikispaces.com/>

⁵⁹ <http://www.galaxyzoo.org/>

⁶⁰ See, for example, <http://www.researchblogging.org/>

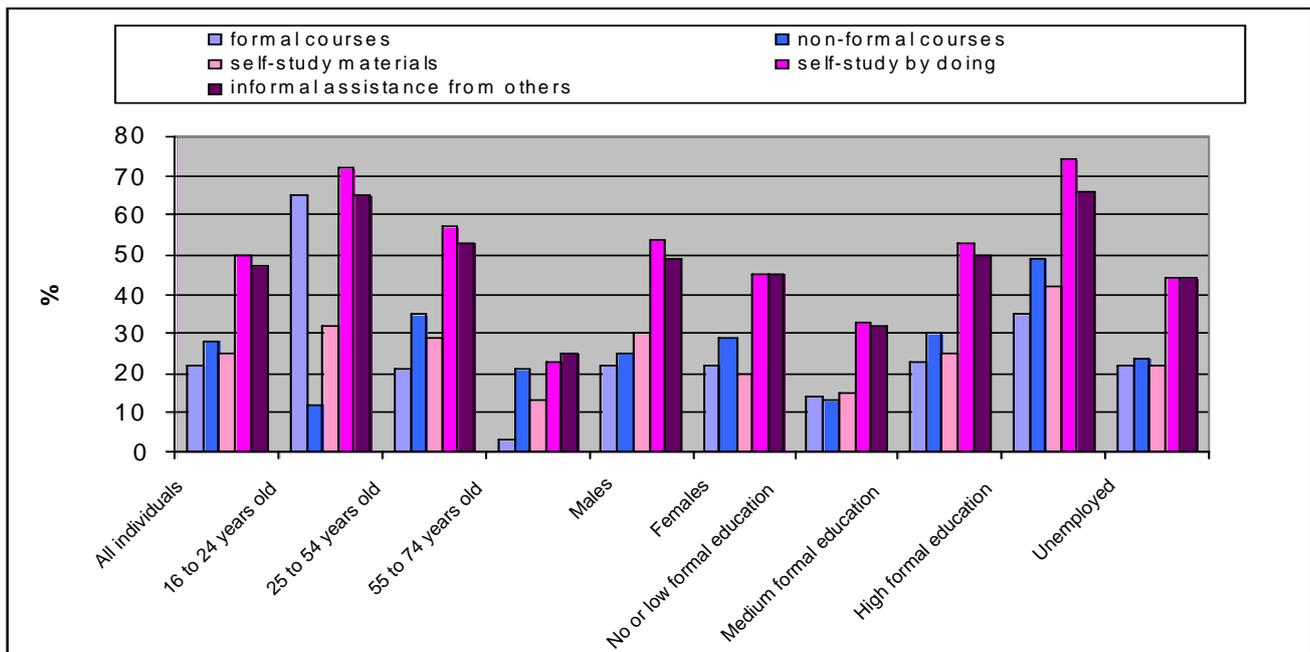


Figure 9: Way of obtaining IT skills in EU27 in 2007 (data source: Eurostat database)

6.1.2 Transversal key competences

Social and civic skills. Social media sites and specific initiatives (e.g. NewsVine,⁶¹ Agoravox⁶²) provide platforms for citizen journalism, which gives an opportunity for people to be informed and discuss issues which are not necessarily even mentioned in major media. Online communities have emerged for social purposes such as helping victims of Hurricane Katrina (Jones & Mitnick, 2006), and for local citizenship activities.⁶³ Participation in these empowers people to learn and affect these developments. Räsänen and Kouvo (2007) found that Internet use is a more significant predictor of civic engagement than interpersonal involvement in Finland, UK, France and Italy, based on the European Social Survey 2002-2003 (N=6,762). Lenhart et al. (2008b) found that when gaming, 44% of teenagers told that they had learnt about a problem in society, and 40% had learned about social issues. Examples show that the blogosphere is an important informal network which can motivate and influence people to act: 61% of blog writers want, to a greater or lesser extent, to motivate people to take action (Lenhart & Fox, 2006), and on average two in ten people have been spurred into action as a result of reading a blog (Edelman, 2007). Learning collaboration by doing is an inseparable part of participating actively in online communities. New members learn from the feedback of other members to participate according to community goals and rules, and develop the negotiation and communication procedures needed for collaborating in the community.

Cultural awareness and expression. Perkel (2006) suggests that the creation of an online social networking profile is a complicated exercise in self-representation that requires a great deal of skill in composition, selection, manipulation, and appropriation. Participating in a global community with members from different cultures allows for new opportunities to become aware of and learn about cultural expressions and differences. This is supported by studies on organised education. For example, O'Brien et al. (2007) found in their study on teachers and students using digital technologies for globally-distributed teams that technology-mediated collaboration (wikis, web forums, videoconferencing, Google documents) was an influential tool with regard to social relationships and improved cross-cultural understanding. Lee & Hoadley (2007) found that after engaging in multiplayer

⁶¹ <http://www.newsvine.com/>

⁶² <http://www.agoravox.com/>

⁶³ For example, citizens reporting needs to fix streets to council at <http://www.fixmystreet.com/> or patients and families giving feedback on health services at <http://www.patientopinion.org.uk/>.

online games, middle-school-age students, most of whom had originally described a lack of diversity in their home neighbourhoods, demonstrated a new sense of empowerment and a greater sophistication in understanding other cultures and technology. Regan & Zuern (2000) reported how linking students' work with local community provided them with concrete examples of disparities that might otherwise remain abstract in class discussion.

Creativity and innovation. Media sharing platforms allow easy access, sharing and commenting of creative works from different people. The diversity of ideas and works can spark new ideas and creativity. Many of the communities already mentioned above, also support creativity, such as a poets' community for creative expression or a scientific community for developing scientific ideas. Furthermore, different topic-specific communities allow people to spread new ideas and develop scope of their community activities. People innovate to adapt existing tools and approaches for their own purposes and often share their innovations freely with peers, which encourages further innovations (von Hippel, 2005). Businesses are supporting user and community innovations, which also allows them to provide innovative products. There are community-type approaches, for example to create and share t-shirt designs and rate them together⁶⁴ or specific communities where people can innovate business ideas, elaborate them in collaboration together and get investors for promising start-ups.⁶⁵ FabLab is an example of a network of laboratories providing facilities for people to innovate and create both in online and offline settings.⁶⁶

Learning to learn skills. Studies from organised education show that the tools used by online communities can support the development of self-regulated learning skills. For example, Baggetun & Wasson (2006) analysed university students employing blogs to support their learning activities, on their own initiative and found that blogging supported self-regulated learning (1) by making it possible to reflect publicly on a topic, (2) as a personal knowledge filter which gathers links to one base, (3) as a knowledge repository to post their own solutions and display knowledge. The authors point out that in addition to developing individual self-regulation, blogs were a means to build a community and to collective self-regulation. In organised learning settings, writing to online journals and blogs has been found to improve students' skills for reflection (e.g. Antoniou & Siskos, 2007; Xie et al., 2008) However, often it is suggested that scaffolding and structure are important for learning reflection and higher-level skills (e.g. Kanuka et al., 2007; Dennen, 2008a; Carletti et al, 2008). Informal communities do not provide a structured learning process for each member. However, their practices and working models do provide learning support. For example, in Wikipedia, quality objectives are stated, and critique, commenting on and evaluating each others' work, is encouraged, which can support participants in improving their critical skills for information evaluation and awareness of different viewpoints.

6.1.3 Personal and life development

Castells (1997) suggests that identity is socially constructed and therefore depends on discourses and interactions in our social and professional contexts. Different settings, e.g., home and workplace, influence the ways in which individuals construct acceptable or appropriate ways of behaving. The development of a new community provides the possibility of creating a new social context in which individuals may explore and develop different ways of thinking that may have an impact on their identity. Identity can be explored in different ways, 1) 'legitimising identity' whereby individual identity is shaped by the needs of the organisation and later internalised by the individuals who construct a meaning around it 2) social identity, in which people define themselves in relative and comparative ways within their environment; and 3) the development of a new self through the process of creation of 'provisional' selves, experimenting with provisional selves, and selecting, revising or discarding the new self. Examples already discussed have shown all these aspects, in order to support personal, professional and social identity.

⁶⁴ <http://www.threadless.com/>

⁶⁵ For example, Cambrian House, <http://www.cambrianhouse.com/>

⁶⁶ See sites of Fab Lab <http://fab.cba.mit.edu/> and FabFolk <http://www.fabfolk.com/>

Personal growth. Participating in communities as a tool for personal growth and development in early adulthood has been raised by Chisholm (2008) for example. Communities help by teaching how to be part of the community, hence it depends on the culture of the community what the new members learn in it. World of Warcraft, for example, has a culture that quickly teaches the newcomers not only technical issues but also the ethos of the game culture and environment (Nardi et al., 2007). Lenhart et al. (2008b) found that when gaming, 52% of teenagers said that they had thought about moral issues. Virtual worlds and 3D environments afford opportunities for exploring identity and engaging in reflection and discussion about personal and moral values (Bers, 2001). However, Turvey (2006) warns in his study about primary school children that whilst there was evidence that children used their virtual space to explore and express their personal identity, there was need for caution as cultural stereotyping was often evident in the content of the children's websites.

Professional identity. The professional community cases reviewed support the experience of identity formation for stronger professional identity, developing one's career and exploring the opportunities in the safe space of an online community of practice (e.g. Hew & Hara, 2008; Allan & Lewis, 2008). While novices can learn to become better practitioners, experienced practitioners can also get new insights into their professional identities and the meaning of work (Gray 2004). The research by Hodgson (2008) suggests also that the online learning communities specifically set up for courses can be experienced as learning spaces where individual and collective identities are constructed. Each participant brings their own context, socio-political and geo-geographical experience to the discussion. Collaborative production communities or maintaining a personal professional blog also serve as tools to establish a professional identity and to develop professional skills in collaboration with an informal community. De Freitas et al. (2006) indicated that social networks (e.g., parental influence, advice from friends and other learners) were extremely important for helping young learners to make their educational choices and career decisions. Therefore, the enhanced networking opportunities brought by online social communities may have an important guiding influence.

Enriching social life. High shares of intrinsic participation motivations (OCLC, 2007) relating to connecting with other people and sharing knowledge imply that many people experience social networking and social media as rewarding, and high usage (Nielsen Online, 2009) shows that these occupy a big share of people's lives. Social networking communities and blogs in particular are places for sharing one's life experiences and providing an opportunity for comparing and learning from the lives of other people. Park et al. (2008) surveyed adults participating in the Korean social networking environment Cyworld about their perceptions on their informal learning in the community. In their survey, 62% of the participants believed that even if they did not intend to pursue any learning, the profile-related activities led them to activities such as reflecting on themselves, sustaining social bonding, acquiring specific knowledge, and cultivating a constructive life, which they considered to be learning-related outcomes. Perkel (2006) suggests that students often use Facebook in the micro-management of their social lives, as an arena for social exploration and to develop social networking skills.

6.2 SUCCESS FACTORS

Literature on the success factors for learning in informal learning communities is scarce. Furthermore, communities are built around different types of activities and have different configurations, hence no common structure or model exists, which could be analysed. The review by Lai et al. (2006) recognised that effective online communities of practice had the following characteristics: 1) clear purpose, 2) diverse membership, 3) strong leadership, 4) appropriate technology, 5) emphasis on participation and community building, and 6) being a long-term project. In their work, they deduced that (effective) communities of practice are always also learning communities. The recognised characteristics that contribute both to the learning of the individual members as well as the community as a whole.

In this section, the report aims to identify success factors from the viewpoint of the individual learner although it is acknowledged that this is strongly linked to the culture and learning of the community. Studies on organised learning communities also provide indicators that are useful for discussing the success of learning in unstructured learning settings. For example, the work by Waters and Gasson (2007) studied factors for different levels of learner engagement providing for knowledge building and learning success, and proposed a model of 5 steps, as illustrated in Figure 10.

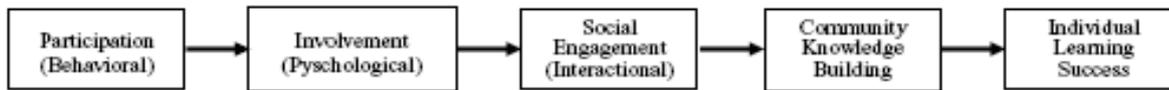


Figure 10: A behavioural-attitudinal-social model of online learning success (Waters & Gasson, 2007).

In informal learning communities the steps and factors leading to learning are more complex and dynamic than in structured learning environments. This follows partly from the fact that informal learning is not necessarily an intentional activity, and not always recognised even by the learners themselves. After starting to participate in the community, the aspects of psychological involvement, social engagement, community knowledge building and perceived individual learning are all interrelated and affect the continuation of the participation. This section will discuss the success factors for different phases as follows, inspired by the model depicted in Figure 10:

- Participation in the community
- Commitment to the community
- Engagement in community activities
- Knowledge building and meaning making in community
- Individual experience and perception of learning

6.2.1 Factors for participation

In different types of communities, there are various external and intrinsic factors affecting the motivation and opportunity for participation.

Perceived value. As reviewed in Chapter 4, community members have different types of motivations for participation, i.e. personal perceptions of what they can gain from participating. Arbaugh (2004) reported in the study on MBA students on multiple online courses that students' initial online learning experiences play a critical role in forming their perceptions of this delivery medium. Hence the initial impression of the online community may be decisive for starting to participate. Hara & Hew (2006) identified the following six success factors for an online community of practice for nurses: (1) self-selection type of membership, (2) a need to ask questions and validate one's practice with others who shared a similar working situation, (3) a need to continually keep up with the current knowledge and best practices in the field, (4) a non-competitive environment, (5) the asynchronism of the online communication medium, and (6) the role of the listserv moderator. The perceived credibility and quality, i.e. trust in the information and activities provided by the community are important, and can be increased, e.g. with visible community rules and monitoring. Andrews et al. (2001) suggest that mid-life career changers consider an online community more trustworthy and attractive if it is endorsed and affiliated with established and respectable groups. Also recommendations of friends play an important role.

Suitable tools and settings. In organisation-based communities, the context has an important impact on community participation. Chen & Hsiang (2007) suggested success factors for establishing an organisation climate for the knowledge community in the workplace: 1) Participation of key personnel and the development of a knowledge strategy; 2) Procedural design complementing current work and establishing a loop of knowledge-sharing; 3) Learner-focused technology; 4) Prudent use of the

knowledge community to complement company business goals; 5) Implementation of new strategies and marketing; 6) Establishing a culture of learning and providing concrete rewards; 7) Providing learning time and space within the company; and 8) Establishing mutual trust between members of a team. Also others have reported that the suitability of platforms and tools used plays an important role in encouraging or discouraging participation (e.g. O'Brien et al., 2007; Hew & Hara, 2008; Lai et al., 2006). Haythornthwaite (2008) maintains that the technology solutions of the community play an important role in allowing latent ties that may later develop into weak ties after following the community from a distance.

6.2.2 Factors for psychological commitment

Flexibility in participation. Being able to decide oneself whether and how to participate is an important factor for becoming involved in communities. For example, Wiliam (2006) suggested five principles that are particularly important for establishing and sustaining teacher learning communities: gradualism, flexibility, choice, accountability, and support. The opportunity to start participating through observing is an important route to active engagement (e.g. Hew & Hara, 2008). Haythornthwaite (2008) suggests that different types of social network ties (strong, weak and latent) play an important role in learning network formation. Weak ties are important for gaining exposure to new information, opinions, and ideas different from our own, and new approaches to problem-solving. Hence, they also support creativity. If online learning environments are directed solely at instrumental aspects or for instructional delivery, they fall short of supporting weak tie contacts and non-learning exchanges important for strong ties. Members of learning communities need to hear new ideas and opinions from weak ties and also work towards group outcomes with strong ties. Studies showing 'active lurking' imply that people who do not contribute still learn and pass on the knowledge from the communities, being community members in their own way (Bowes, 2002; Takahashi, 2003).

Interesting tasks. Game studies show that maintaining the psychological involvement, i.e. sustaining motivation and engagement requires the online game to provide a player with challenges that are closely matched to his or her skill level of playing (e.g. Kiili, 2005; Wang & Wang, 2008). If the challenge is significantly lower than the player's skill level the player may feel bored. In contrast, if the challenge is significantly greater than the game player's skill level he or she may become frustrated. This is also applicable for other online communities, as they too need to be able to provide meaningful activities for participants with different skills levels. In production communities, this can be implemented by appropriate and dynamic task allocation, based on recognised skills and knowledge. In interaction based communities, literature suggests that expert members may consider sharing knowledge and helping others as a meaningful, rewarding and learning activity for themselves (e.g. Hew & Hara, 2008; Gray, 2006).

6.2.3 Factors for social engagement

Encouraging activity environment. All the factors discussed above are preconditions for active engagement in community activities and interactions. Kang et al. (2007) found that commitment to the community feeds into the continuing participation (loyalty) and these together contribute to the community activities, i.e. engagement and community knowledge building. The factors affecting commitment and loyalty were 1) support for member communication, 2) perceived community value, 3) recognition for contribution, 4) freedom of expression, and 5) interactive communication. Members with strong affective and psychological attachment, identification, and involvement actively engage themselves in positive and contributing activities and put the community and its goals ahead of their own interest. They were more active in recruiting potential participants, in sharing their expertise with others, and in creating positive changes for the community. Hew & Hara (2008) found that for active engagement in the community, it was important that the sharing environment is respectful, and that the communication technology is easy to use. Andrews et al (2001) suggest that trust and online interaction can be enhanced with visible purpose and policies, and having professionals monitoring and facilitating discussion. Geer and Barnes (2007) found that initial communication patterns are

powerful in determining subsequent interactive behaviour in the learning communities and discussion forums. Once established, they may be difficult to shift. Hodgson (2008) maintains that establishing one's voice and identity in a community is both critical and difficult, and for example autobiographies can contribute to it.

Sociable and emotionally positive environment. Research suggests that it is important that the community members feel a sense of belonging to the community (Isomursu et al., 2004; Lai et al., 2006). Trust and social relationships affect learner comfort through being able to express their criticism and to engage in creative learning and group work (Geer & Barnes, 2007; Lai et al. 2006). Allan & Lewis (2006) reported on the importance of the learning community providing a safe place, a comfort zone for personal and professional exploration and development. Lai et al. (2006) suggest that having blended communities also with face-to-face meetings is important in creating the 'sense of community'. Nardi et al. (2007) point out that the zone of proximal development (ZPD) is not only about acquiring deeper understanding and new ways to integrate and make coherent concepts and ideas, it is also about motivation. In the World of Warcraft, the responsiveness players experience as they get quick responses to questions is part of what creates a supportive environment for learning. Part of the emotional aspect of the ZPD is positive encouragement, the avoidance of frustration, and a sense of moving forward. As the observations of the learning conversations in World of Warcraft proved to contain a rich array of emotions, Nardi et al. propose incorporating emotion into community activity analysis.

6.2.4 Factors for knowledge building in the community

Moderation. In many studies, the role of the online moderator is identified as critical in sustaining the online community over an extended period or enhancing the learning function (e.g. Redecker, 2009; Dennen, 2008). Moderation and external learning support can also be facilitated by tools, as demonstrated by Hyunsong & Dongsik (2008) in their work on coordination support on the development of shared mental models (SMMs) and coordinated action in a computer-supported collaborative learning (CSCL) environment. Results showed that facilitation was needed, but that the visual tool support was more effective than tutor support in a CSCL environment in prompting learners to recognise when they have to participate, what should be completed, who is responsible for certain subtasks, scaffolding in reflecting group work processes and keeping them engaged in their group work. These are not surprising results in structured learning approaches where the learning goals have been externally defined, but research on informal workplace learning also support the view, e.g. by Gray (2004). Also the study on IM usage for a children's learning community with TV interface ended with similar results on interaction moderation (Aarreniemi-Jokipielto, 2007). The children considered that moderation of discussions is necessary for supporting learning and focused discussions, and they also themselves developed rules for the interaction.

Emerging leaderships. Online communities allow different leaderships and roles to emerge, for example Nichani (2001) discusses the important role of three types people in the network: connectors, mavens and salesmen. Waters & Gasson (2007) noted in their study of an online community of inquiry that the members of the community appear to rapidly develop a shared model of *who-knows-what* that permits individuals to locate knowledgeable sources of information with minimal effort, targeting the key players' posts more effectively. Leadership was found to be important in educational context, as knowledge building threads simply did not exist without notable leadership behaviour. The leadership largely followed a shared pattern with 6-8 members steering the debate and contributing more than other members. None of the thought-leaders had low grades, however, not all A-grade students were characterised as thought-leaders. This also links to the different learning styles as discussed in Chapter 3. The social and knowledge leadership roles may be occupied by different persons, and communities should allow for that as it enriches the community networking. Ryymin et al. (2008) found in their study on teacher social networks that there were a few central actors in the community who dominated technical and pedagogical knowledge exchange and to whom their colleagues actively turned when seeking advice. There were some actors central in the network of informal interaction that were,

simultaneously, peripheral in ICT-related networking activities. At the same time, the central actors of pedagogical and technical advice were not necessarily the socially central persons in the community.

6.2.5 Factors for experiencing learning

Although informal communities are often not aimed mainly at learning, experiencing learning can increase the appreciation for the community, and the perception of its value and usefulness, as well as fulfil intrinsic motivations for enjoyment and accomplishment. This can, in turn, increase the commitment and engagement in the community. However, as learning in online communities differs from the more familiar instructionist approaches, members may not become aware that they have learned something considered valuable by the external world.

Perception of learning. Benbunan-Fich & Arbaugh (2006) found that students in knowledge construction courses with collaborative assignments did not perceive that they had learned as much as students in knowledge transfer courses, where knowledge was transferred through the system. Because “constructive” learning is less structured and requires students to make sense of the material, students may feel they have learned less, a perception that is at odds with their actual knowledge acquisition evidenced in their final grades. Benbunan-Fich & Arbaugh pointed out that learning perception and performance are not always consistent, as they are measuring different aspects of the learning experience. Park et al. (2008) found that among adult social networking users 65% of the respondents defined learning as an acquisition process, particularly knowledge acquisition, while 32 participants defined learning as a reflective process. The different perceptions on learning showed different perspectives in their answers relating to whether social networking profile related activities had led them to learn. Overall 38% of respondents perceived that no learning was taking place in social networking, and 81% of these respondents saw learning as knowledge acquisition.

Skills for self-regulated learning. Deci and Ryan (1985) suggest that students have 3 basic psychological needs: feeling competent, having a sense of autonomy, and having satisfying and secure relationships. Meeting these basic needs is a strong factor in feeling interest, and students continuously assess their learning conditions using these factors (Boekarts & Minnaert, 2003). In their study on online learning in a course, Boekarts & Minnaert suggested that the emphasis of the three factors fluctuates during the process; the satisfaction of the need for autonomy is very important in the initial stages of the learning project, and feeling socially related in the successive stages. Students' perceptions of their learning conditions are important for their own interest assessment and also for skills assessment. People with good self-regulation skills may be able to assess their own learning but this could also be supported for example with community approaches for giving feedback and recognition of learning. The social cognitive perspective of self-regulated learning suggests that effective learning is determined by the interaction between personal, behavioural, and environmental influences; particularly, high self-regulated learners hold higher motivation (personal), apply better learning strategies (behavioural) and respond to environmental demand more appropriately (environmental) (Wang & Lin, 2007). Wang & Lin suggest studying the reciprocal interactions of these influences as it may help in manipulating environmental influences, which impact student perception, and learning behaviours and help facilitate student learning.

6.3 DISCUSSION

This chapter has reviewed examples demonstrating that online communities can facilitate learning related to all the key competences for lifelong learning (European Parliament and the Council, 2006). In addition to topic-specific and transversal competences, community participation can support explicit and implicit learning of concepts, practices and attitudes for developing one's professional and private identity and life. These show that learning in communities can provide for all the learning outcomes aspects as discussed in the proposed European Qualifications Framework (EQF) (European Parliament and the Council, 2008): knowledge (theoretical or factual), skills (cognitive and practical), and competence (responsibility and autonomy).

The learning enabled by the community depends on the topic, tasks and culture of the community. Many, although not all, collaborative communities also learn on a collective level, revising their rules, processes and goals according to the collective understanding of the participants, reflecting the features of Communities of Practice. Learning and development on the community level is important, as it keeps the community updated with the societal context and responds to the needs of the participants. Empowering the participants to affect the development of the community can improve its relevance and value in reflecting up-to-date collective knowledge of, for example, a profession, task or interest-based group in the society. This emphasizes the need for actively engaged and committed members, who facilitate and participate in the collective meaning making processes.

Lai et al. (2006) suggest in their review that there are six factors common to effective online communities of practice: 1) clear purpose, 2) diverse membership, 3) strong leadership, 4) appropriate technology, 5) emphasis on participation and community building, and 6) being a long-term community. In this chapter, these success factors were considered from the individual's point of view, starting with participation and leading to individual (and collective) learning. However, it seems that the success factors for individual learning in communities are very similar to those recognised by Lai et al., as they can be defined as: 1) perceived relevance and opportunity for participation, 2) psychological commitment to the community goals and culture, 3) socially supporting environment for interaction, 4) norms, rules and (diverse) roles that facilitate community learning, and 5) self-perception and personal skills for learning. All of these are interrelated, and suitable technologies play an important role for all aspects. The success of the community is crucial for the success of the learning of its members. However, community does not ensure learning for all members, as individual learning skills and attitudes are also important.

Figure 11 gathers together the success factors discussed in this chapter, showing their circular dependence. There also seem to be some shortcuts from the individual learner's point of view. For example, observers can learn without active social engagement, or an individual can learn through his/her creative activities and reflective contributions even though there is no high collective meaning-making. Furthermore, there may be people who 'participate' via contributions in communities without committing psychologically to the community culture and goals, sometimes negatively, as demonstrated by vandalism in Wikipedia for example (Viegas et al., 2004). These kinds of participants have the potential to enrich the community with new ideas, but they are also a risk in that they can affect the experience of other community members, community 'feeling' and community outcomes.

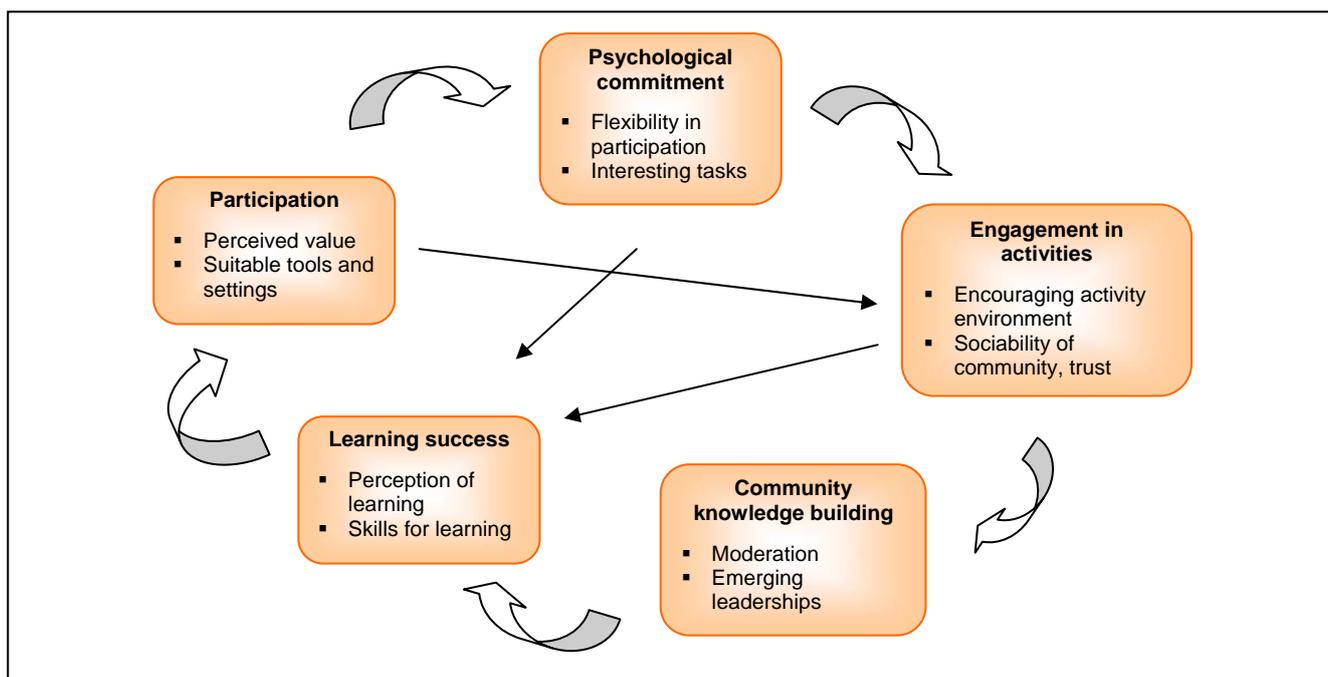


Figure 11: Aspects and factors for learning success in online communities

7 CHALLENGES

Social computing tools facilitate personal knowledge creation, management, and new connectivity with people and resources, enabling different types of learning. However, there is still a long way to go to implementing learning spaces (Punie et al., 2006) filled with self-directed lifelong learners benefiting from the various learning opportunities provided. Challenges relate to being able to provide suitable learning opportunities for different learners with different interests and skills for lifelong learning in general and digital competence in particular. As not all individuals initially possess skills for self-regulated learning, supporting structures should be provided either by communities themselves or by linking institutions with communities in innovative ways. Changes in the current institutions and validation systems for learning are a necessary to benefit from the learning that can be supported and provided in informal online community settings.

7.1 REACHING LIFELONG LEARNERS

Participation in online community environments may depend on a number of learner characteristics, relating to economic, social, personal and community-specific context and background. Although easily accessible online communities could provide versatile learning opportunities for low-skilled and unemployed people, who particularly need to update their skills, these groups may also face specific difficulties in benefiting from this learning.

7.1.1 Accessing online communities

Basic access to ICT and internet. The lack of resources to invest in hardware and software is an economic barrier hindering participation in internet-based approaches especially in developing countries (OECD, 2007). As shown in Figure 12, 57% of the EU27 population had accessed the internet in the last three months of 2007. However, there are large differences between and within countries, especially in rural and poor areas where internet penetration can be low. Furthermore, there are different social groups at risk of exclusion, such as older people, the less educated or the unemployed. For example, only 19% of females and 31% of males aged 55-74 used the internet regularly in the EU27 in 2007, as opposed to 77% of females and 79% of males aged 16-24 (Eurostat data).

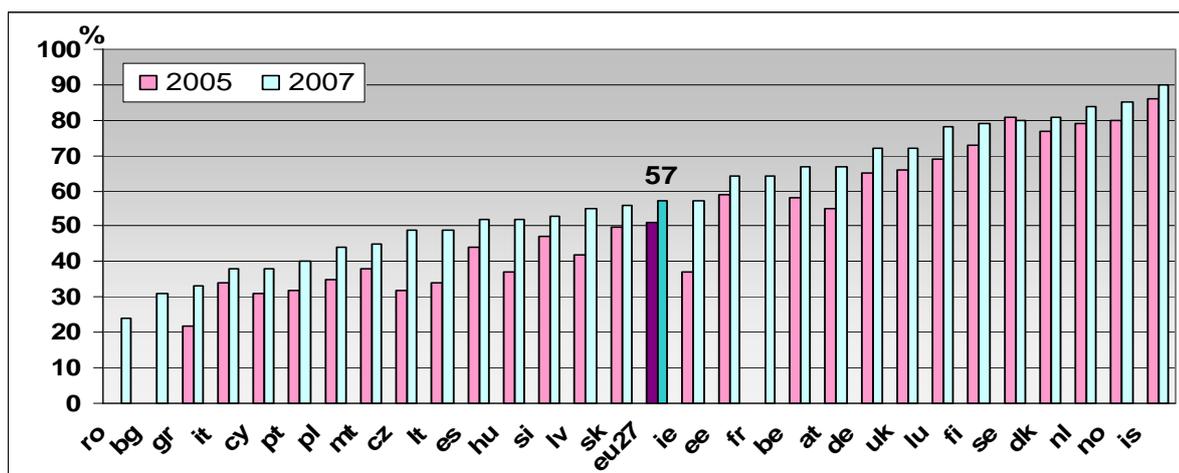


Figure 12: Percentage of Europeans that have accessed internet in the last 3 months (Eurostat data)

Content accessibility. Although an online community platform in itself may be planned to be accessible to different types of users, the challenge is to take care that the content being created in the community and in the discussions also remains so. For example, senior members of the community,

disabled users, or people with different native languages may face problems in participating in the communities because of forms of communication. Lai et al. (2006) raise the challenge of multilingual communities as a topic in need of further attention and research. Faiola & Macdorman (2008) found differences between holistic and analytic cognitive styles linked with Western and East Asian cultures. To reach users from different countries and cultures, online content and communities should be developed with sensitivity to cultural differences. Design for All approaches⁶⁷ for technology, accommodating community norms, and induction activities are important for enabling participation for people with different capabilities and interests.

Risk of increasing divides. Figure 13 demonstrates that, at present, only a small number of European individuals have contributed to online discussions, and the generational differences are large. Social differences are also affecting the young generation, e.g. Prinsen et al. (2007) found that students with immigrant parents wrote fewer contributions than those whose parents were not immigrants. Wang & Wang (2008) investigated online games and found that there are significant differences between genders in the effects of the computer self-efficacy and computer anxiety on behavioural intention. Women were more anxious about the complex technology, which affected their intention to play games, while for men anxiety about technologies did not affect their playing intentions. Research on the EU10 member states (Chytilova et al., 2009) showed that although the recently joined countries are quite effectively closing the gap in information society developments at a country level, digital divides are coinciding with other divides, risking further exclusion for certain groups. As new opportunities for seeking information, to raise issues for discussion, to connect and learn are emerging on the Internet, it is important that all people have the opportunity to participate in online networks and communities in order to benefit from the information, resources and connections available.

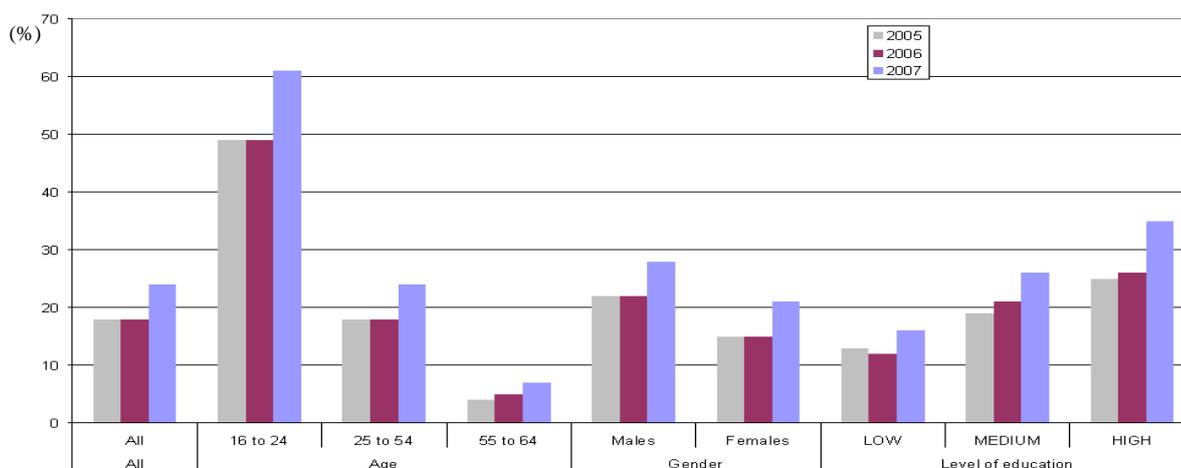


Figure 13: Percentage of individuals in EU-27 who have posted messages to chat rooms, newsgroups or an online discussion (based on Eurostat data)

7.1.2 Learning skills and attitudes

Educational status and preparedness for lifelong learning. In 2006, of the age group of 25-64, only 3.7% of people with low education, as opposed to 18.7% with tertiary qualifications, participated in education and training activities (Eurostat, 2009). Hargittai & Walejko (2008) found that among students, creative activities were related to an individual's socioeconomic status as measured by parental schooling. Boulton-Lewis et al. (2006) found that among older adults, high income was

⁶⁷ Design for All" is a concept which consists of three strategies: (1) Products/services and applications should be usable by as many people as possible, regardless of age, ability or situation, without any modifications. (2) Products should be easily adaptable to different users. (3) Products should have standardised interfaces, capable of being accessed by specialised user interaction devices. See, for example, European Design for All e-Accessibility Network (EdeAN) <http://www.edean.org/>

significant in wanting to learn and low education was considered an obstacle to learning. These findings support the argument that the initial level of education is important for having an interest and curiosity to learn more (Renninger, 2000), and also significant for one's perception of the need and skills to learn. In the study by Nelson & Ketelhut (2008) the learners with low levels of initial self-efficacy did not use the guidance opportunities available as much as learners with higher self-efficacy and reached poorer results. Kopcha & Sullivan (2008) examined the effects of prior knowledge, learner preference for control and type of control (learner or programme) on the achievement of middle-school students. The results indicated that matching learner preference for control is an effective strategy for high-prior-knowledge students but not for those with low prior knowledge. These examples suggest that efforts should be targeted to support people with low initial skills and perception of their learning capabilities in order to enable them to start participating in lifelong learning.

Different learning styles and interests. When finding suitable community environments on relevant topics, it seems that many different learning styles (as in Kolb, 1984) can be supported. People who prefer reflective observation can find several sources for learning on various topics in online communities. On the other hand, people participating in production communities or interested in expression with digital media can also use communities as places for active experimentation and socialisation. Learners who appreciate concrete experiences and examples can find both quick responses in topic- or organisation-based communities – which also can provide discussion ground for abstract conceptualisations. A great challenge in supporting lifelong learning with online communities is to find or create suitable communities to match personal learning styles and interests. Reio & Wiswell (1997) reviewed studies showing that interest and curiosity for learning do not reduce with age; adults may demonstrate even more curiosity than younger people when properly stimulated. Their research suggests that curiosity plays an important role in adult workplace learning and that it should be cultivated in organisations.

7.2 DIGITAL COMPETENCE

Skills to confidently and critically use digital tools for expression, communication and collaboration for the purposes of work, leisure and learning, are essential in the European information society.⁶⁸ For benefiting from the potential of learning in ICT-facilitated communities, both the basic tool usage and more advanced skills are important. The digital divide is changing, as some of the traditionally considered divides of access are closing, while social computing brings forward new skills-based divides. Divides between the digital natives and non-natives, and different social groups may hinder the take-up and learning benefits from reaching new groups. Furthermore, if people who are responsible for guiding and teaching others lack digital competence, they are not able to promote these opportunities for their learners either. For example, only 56% of older school teachers feel competent in using ICT (Empirica, 2006), which affects the ways they promote and support their pupils' learning and using ICT opportunities.

Using ICT and internet. Studies suggest that ICT skills are a major factor in explaining the different participation rates in collaborative content creation or gaming between men and women (Hargittai & Walejko, 2008; Wang & Wang, 2008). In 2007 in the EU27, 71% of 55-74 year olds indicated that they have no internet skills (i.e. they have not completed any of the basic activities asked) as opposed to only 11% of 16-24 years olds without these activities. Furthermore, the level of education has a strong effect. The percentage of people with no internet skills was 40% for the total population, but only 12% for the highly educated and 63% for those with low or no education (Eurostat data). Figure 14 shows the differences in the internet skills for different groups in EU27, based on Eurostat data.

⁶⁸ European work for these objectives is carried out, for example, under the European Charter for Media Literacy, <http://www.euromedialiteracy.eu/>, and by the Digital Literacy Expert Group, <http://www.digital-literacy.eu/>

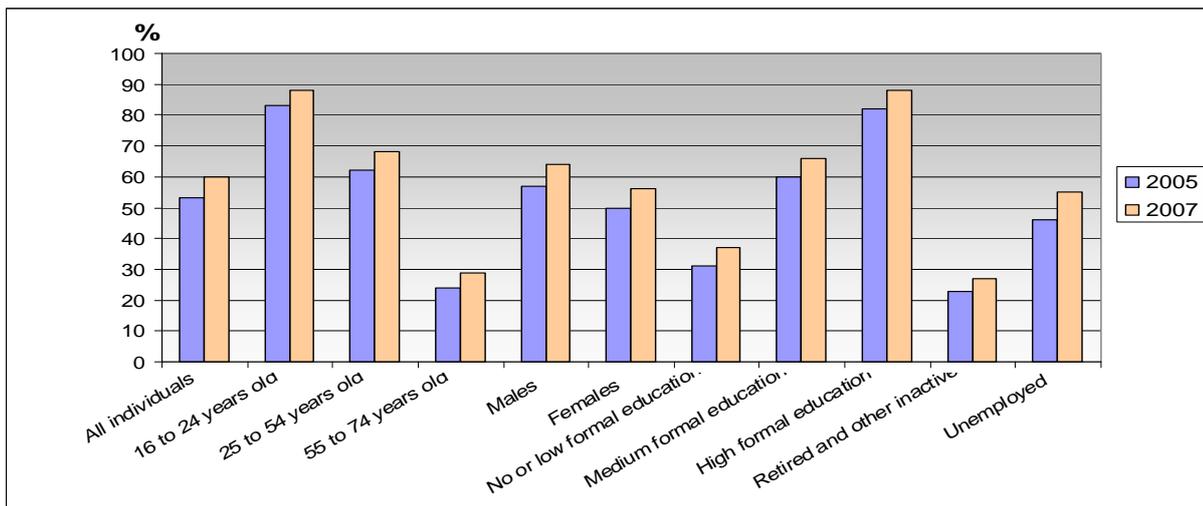


Figure 14: Percentage of individuals with internet skills (low, medium or high) in EU-27 (Eurostat data)

7.2.1 Skills for safety, security and privacy

Knowledge of privacy risks. Gross and Aquisti (2005) found that, looking at a sample of 4,500 Facebook profiles, 80% contained an image of the user; 87% contained a date of birth; 39% listed a phone number; and over 50% listed a current residence. The majority of users in the study also listed sensitive data such as sexual preferences ("Men", "Women"), current relationship status, and political views. Users need skills to understand for example that social networking sites (without the appropriate privacy settings and critical skills) can lead to the loss of control of personal data, and to having it delivered to third parties for commercial purposes. Furthermore, online contributions can build a permanent visible trail, which may even affect employability later. For example, a survey of over 3000 employers in US in 2008, showed that 22% of hiring managers use social computing sites to screen potential employees, and 34% of them had found negative information (e.g. drinking, bad-mouthing of colleagues), 24% positive information (e.g. creative expression) influencing their decision for the job applicant (Careerbuilder, 2008).

Protecting young internet users. Lenhart (2005) found that 79% of young internet users concur that they are not careful enough when sharing information online with others. Similarly, in terms of young people's own challenging online behaviour, Berson and Berson (2005) found a significant number of adolescent girls reportedly engaging in risky activities including sending personal photos to online acquaintances, and arranging face-to-face meetings. OFCOM Media literacy audit (2008) found that the number of households using safety provisions for children's internet use had declined. Supporting children to learn critical and safe use of internet is important.

Awareness of security threats. Many people⁶⁹ use the same password for every website, and if there is enough information to guess it based on shared online information and content then it may be used also in other contexts, both private and work-related networks (Sophos, 2008). User-contributed content can also be infected with various forms of malware (Provos et al., 2007). For example, in March 2007, the SpaceStalk spyware Trojan horse was discovered embedded in a QuickTime movie uploaded to MySpace (Sophos, 2008). Surveys suggest that 50% of IT and security professionals have concerns that increases in user-contributed content will also increase the prevalence of vulnerabilities in the enterprise, and 45% have concerns that employee access to confidential information combined with web2.0 services increases the risk of data leaks and theft (Forrester, 2007).

⁶⁹ 32% according to Sophos(2008), 41% in OCLC (2007) use the same password always or often.

7.2.2 Skills for critical media usage and sharing

Critical evaluation and use of information. As there are plenty of resources available, published without official quality checks, skills to critically evaluate their reliability are increasingly important. Studies show that people generally have high trust in user-generated online content, for example 55% of 25-34 year-olds in the US consider Wikipedia a more credible source for information about a company than radio, newspaper, TV and company communications (Edelman, 2008); 34% of European internet users have decided, based on a blog, not to buy a product (Deere, 2006); 7.9% of respondents in an eUser study decided not to follow a doctor's advice, and 19.5% not to go to a doctor, because of online information.⁷⁰ It is important that they have the necessary skills to evaluate which sources of information are reliable and which not, in order to attain relevant knowledge and valid information. Some educational institutions have banned Wikipedia use in schoolwork, as the students have not shown critical skills in using it (Ala-Mutka, 2008).

Critical skills for online contributions. The ease with which content can be created and published with new tools may lead to less critical thinking in the process, leading to risks for oneself by disclosing private information or damaging others. It is easy and fast to send angry blog posts or funny embarrassing videos and pictures of neighbours, classmates, colleagues, teachers, and public people for everybody to see, but the consequences may be damaging. 32% of US teenagers have been targets of cyber bullying (Lenhart, 2007). Australian schools in almost all states are banning access to social media sites largely because of cyber bullying.⁷¹ Furthermore, companies are worried about their employees revealing sensitive information. In the US, 62.3% of companies reported they already have a simple or detailed written policy to define appropriate uses of internal and external web log or message board systems, including personal use policies, confidentiality rules, monitoring and privacy policies, etc. (Proofpoint, 2007). However, the same study showed that 21.4% of the companies had detected exposure of sensitive information in blogs or similar by their employees, 19.2% of the companies disciplined employees, 9.1% terminated their contracts.

Knowledge of intellectual property rights. YouTube and media sharing platforms show several copyright infringing materials uploaded by users, and causing legal challenges for the platforms. Users may also upload their own creations without paying attention to the licences they agree with when uploading. For example, there has been a case with Flickr, where user-created photos were used in a large advertising campaign, surprising the original people creating and modelling in the photos.⁷² Universities are also facing problems with plagiarism and cheating using resources found on the Internet (Nadelson, 2007), and students often seem to be unaware of the IPR norms and rules. For example, Chou et al. (2007) found in their survey that only 66% of 244 students answered correctly about acceptable uses and, furthermore, only 37% could choose the correct reason for their answer.

7.3 ASSESSMENT AND QUALITY OF LEARNING

Research on online learning is often targeted at organised learning settings, where the virtual learning groups are relatively small, well structured and facilitated, which makes it easier to reach a consensus and engage in a participatory democracy. Therefore, Bers (2001) raises very relevant questions in his study on the transferability of the lessons from this kind of environment. What will happen when scaling up? What mechanisms need to be put in place, when learners engage in a full-size virtual community and not only in a micro-community? What kind of assessment methods should be used to evaluate the learning experience when scaling up? Furthermore, if educational institutions want to learn from the new learning approaches taking place in informal settings, they should no longer apply the old systems for assessing learning outcomes. The European approach to recognise learning in non-

⁷⁰ eUser survey of 10 European countries, 2005,

http://www.euser-eu.org/eUSER_PopulationSurveyStatistics.asp?KeyWordID=2&CaseTitleID=878

⁷¹ <http://www.australianit.news.com.au/story/0,24897,21330109-15306,00.html>

⁷² <http://flickr.com/photos/sesh00/515961023/>

formal and informal settings is to identify and measure learning outcomes according to a common interoperable framework, the EQF (European Parliament and the Council, 2008).

7.3.1 Validating learning outcomes

Revising assessment. Assessment is a major driver for intentional learning processes in education, and may affect the way they take place, leading to the 'coping' vs. 'learning' mode for example, as discussed by Boekaerts and Niemivirta (2000). Furthermore, it may cause resistance to changing learning practices, if the assessment does not change. Students may not want to collaborate and share their work with each other at university, because they would be graded individually. Encouraging collaborative learning and learning new skills in different ways requires revising the objectives for measurement. Cedefop (2008) has detected a shift already taking place from content-led curricula to a learning outcomes approach in Europe. This approach can also be applied to non-formal and informal learning, allowing personal learning paths and validating the outcomes. The European qualifications framework (EQF) defines learning outcomes as statements of what a learner knows, understands and is able to do on completion of a learning process (European Parliament and the Council, 2008). Outcomes are defined in terms of knowledge (theoretical or factual), skills (cognitive and practical), and competence (responsibility and autonomy). A learning outcomes approach promotes active learning, blurring the distinction between theoretical and practical learning, and is highly dependent on context (Cedefop, 2009, p. 41). Furthermore, it does not differentiate between collaborative or individual learning processes, as the focus is on the final outcomes.

Implementing validation processes for non-formal and informal learning. The possibility for achieving recognition of learning efforts is important for lifelong learners, as demonstrated for example in the study by Holtham & Rich (2008) where they pointed out that a question that came up repeatedly in developing their learning system was “are we going to be able to get any qualifications from this?” Cedefop (2008b) has recognised three main phases of the validation process: identification, assessment and recognition of non-formal and informal learning, and Figure 15 describes how the validation of learning in formal and informal systems could be linked. Cedefop states that the quality of the validation process very much depends on the initial identification and assessment of learning. As discussed earlier, online community members may also not consider that they have learned externally valuable things, even when they have. Attwell (2007) found in the study on European SMEs that, although a lot of informal learning was taking place with ICT, none of the employees in the study had attempted to claim accreditation for their learning. According to Common European Principles, the validation systems should contain mechanisms for guidance and counselling of individuals (Cedefop, 2008b). From the individual's point of view, validation needs to be voluntary, and the results remain the individual's property. It is important to ensure fair treatment and equal access to the validation systems, and that they have transparent processes, procedures and criteria (Cedefop, 2008b).

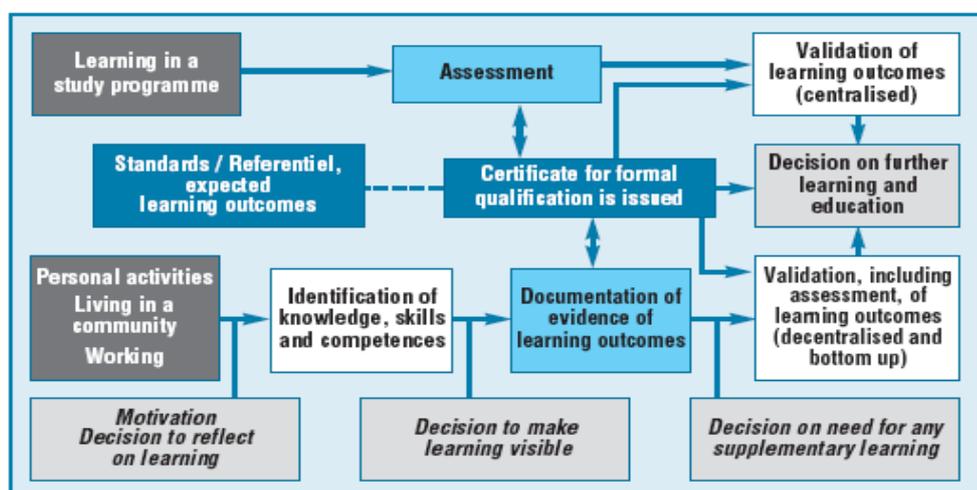


Figure 15: Different processes and stages of valuing learning outcomes (Cedefop, 2008b)

Reliability of peer assessment. The strength of communities is that they can provide peer support and assessment which encourages and recognises learning. It has even been suggested that skills recognition of professional peers is more valuable than a 20 year-old certificate of a formal degree (Ala-Mutka et al., 2009). However, assessment is a high level cognitive skill (Bloom, 1956) and not all community members necessarily possess enough expertise and experience to give informed and meaningful evaluation. Furthermore, socially situated assessment (either peer assessment or self-assessment) in the context of a peer group is different from self-assessment related to individual work (Boekaerts & Minnaert, 2003). Students' interest in skills acquisition and experienced emotions during the learning task bias their self and peer assessment. Leinonen and Järvelä (2006) found that in distributed work collaboration, when individuals do not have situational information, e.g. what others think about the content of the shared task, they tend to make personal attributions. In other words, their evaluation of others' knowledge focuses on stable tendencies like the expertise of other individuals. Furthermore, in online systems, there is also a chance to cheat. For example, David and Pinch (2006) found that many of the Amazon book reviews were not "real" product reviews but done by friends and the authors themselves. Sometimes they were just copied from other reviews in order to increase the reviewer ratings.

7.3.2 Effectiveness of the learning process

Getting feedback. People with less developed self-regulated learning skills in particular can benefit from external feedback for guiding their learning. Getting comments and feedback from peers may also improve motivation and achievement (Redecker, 2009). Assessment can capture learners' efforts on relevant issues, generate appropriate learning activities, and provide feedback on the learning results in order to help learners understand the learning targets better, and support external recognition and certification of learning results (Gibbs, 1999). Formative assessment during the learning process (as opposed to summative assessment certifying final results) can be used to improve learning when in process (William, 2007). Yeh (2009) found in his work that rapid formative assessment in maths and reading can even be 124 times more effective than reducing class sizes for improving student achievement. Furthermore, in his earlier studies he had found that rapid formative assessment had improved personalising instruction, increased students' self-efficacy and engagement and led to better achievement. Community approaches offer an opportunity to provide feedback from several peers, but if there is no planned structure, the challenge is whether all members receive feedback that can help their learning by acknowledging achievements, revealing misconceptions and by guiding towards efficient routes in reaching their learning goals.

Self-regulation skills. Few lifelong learners have systematically practiced self-directed learning in their basic education, and it is likely that many people start participating in online communities without strong self-regulation skills for learning. They need scaffolding (Wood et al., 1976) to learn the topics of their interest, as well as to adopt better skills to learn. Many of the online community studies reviewed have brought up the need for moderating discussions in order to facilitate knowledge construction (e.g. Song, 2004; Dennen, 2008a). Azevedo et al. (2008) compared students having low prior knowledge in externally facilitated learning (ERL) and self-regulated learning (SRL) approaches. Learners in ERL gained more declarative knowledge and displayed more advanced mental models, regulating their learning by activating prior knowledge, engaging in several monitoring activities of their learning, deploying several effective strategies and engaging in adaptive help-seeking. Learners in SRL used ineffective strategies (such as copying from hypermedia environments) and engaged in fewer monitoring activities. Therefore, one challenge is to improve the self-regulation skills of learners, and research shows successful examples. For example, Sanz de Acedo Lizarraga et al. (2003) found significant effects on general intelligence, academic achievement, cognitive flexibility and metacognitive strategies in an intervention programme practising self-regulation strategies in a secondary school (cited by Steffens, 2006). The differences between the experimental and the control group were maintained even after a two-year period. Dignath et al. (2008) found in their meta-analysis work that self-regulated learning training programmes have proved to be effective even at primary school level.

Community effectiveness. As discussed in Chapter 6, an effective community with collective meaning-making also facilitates individual learning in the community. However, 'the very qualities that make a community an ideal structure for learning – shared perspectives on a domain, trust, a communal identity, longstanding relationships, and an established practice – are the same qualities that can hold it hostage to its history and its achievements' (Wenger et al., 2002). Knowledge that is aligned with the specific predispositions of a community and supports the identity and current practices of its members is likely to be adopted more readily than knowledge that challenges current identity and practice. Furthermore, Haythornthwaite (2008) suggests that in interdisciplinary groups, a major effort is needed to bridge the differences of members in terms of knowledge base, disciplinary practices and physical location in order to learn and build collective knowledge. In online communities where new participants enter continuously, the norms and practices need to be expressed clearly and their learning needs to be supported in a way that can be adopted easily by new members from different backgrounds. Lai et al. (2006) suggest following design principles for effective online communities of practice: They should 1) be cultivated to grow naturally, 2) be designed to support sociability and participation, 3) be created to attract a diverse membership, 4) be managed by providing for different roles, 5) include technology designed with functionality to support sociability and knowledge sharing, 6) have a blended approach where online activities are supported by offline activities.

7.4 INSTITUTIONAL CHALLENGE

Currently, online communities typically exist separately from learning institutions, although they provide spaces for the learning of similar topics. Integrating learning in these informal environments with recognised educational systems would call for innovating and transforming practices and technologies as well as the transformation of the concept of learning that is encouraged, valued and acknowledged.

7.4.1 Linking learning in communities and institutions

Interfaces between institutions and communities. The resources reviewed suggest that many topics, skills and competences can be learned and improved in informal online communities. Community approaches can also be applied to educational courses or participation in communities can be used as part of structured learning tasks. However, there is still an important need for general institutional education, as, for example, studies suggest that those benefiting most from the online collaborative activities are the ones who already have basic skills on the topic (Prinsen et al., 2007; Turvey, 2006). A formal education system also ensures a systematic education on basic skills for all, before specialising in specific topics with the help of different online communities. However, participation in communities may support the development of transversal skills such as collaboration, innovation, creativity and expression, and cultural awareness early on, as these can be practised in online social interaction after acquiring the skills for using interaction tools. Furthermore, it is important that formal education prepares people to recognise and participate in these communities for their lifelong learning. This might be achieved by using community approaches and integrating participation in communities as part of learning aspects in formal education. Research is needed to study how restricted and open community approaches could be best combined with institutional education, in order to enhance the transversal skills, practical learning as well as interest and personalisation of learning with a lifelong perspective.

Limitations of communities. If online learning communities can have a role in supporting lifelong learning, one needs to consider what can and cannot be learned in communities. Can all the skills needed for future jobs be learned, maintained and updated in online communities? Are there issues that would need an institutional education approach and others which would be extremely well suited to being learned in communities? Personal and professional development seem to be well supported in informal communities with peers, even if the connections are only online. Also some implicit skills, especially relating to digital production, can be learned in online communities. However, skills requiring motorical specificities and using different senses in real-life situations require hands-on and

face-to-face learning situations. Research is needed to find which skills could be efficiently learned in online interaction, which not, and what would be a good balance, as everyday life is never only online. Could specific communities be supported to emerge and thrive in areas where future skills needs are anticipated to increase?

Sustainability and funding. Bottom-up self-organising communities motivate members better than communities that have been set up on purpose (Osimo, 2008). However, discussion moderation and facilitation is an important factor for community knowledge building. In a completely user-driven community, there is no guarantee that the emergent leaders will emerge and stay in the community. In the commercial or association-driven communities, there is no guarantee that they can survive with their business model for a longer time. Therefore, it may become difficult to find good communities for learning, to evaluate their effectiveness before participating, or to anticipate their sustainability. If considering linking participation in open communities (e.g. professional CoPs) with formal education, some measures would be needed to ensure that the community is useful and stays alive. This would require institutional investment in communities, possibly in the form of funding, technology or as personnel resources who put their effort into facilitating discussions. At the same time, this could serve as a useful two-directional interaction channel between educational institution (giving training on a specific topic) and a community of practitioners (knowing the skills needed in practice). A challenge would be to find a balance between a bottom-up community approach and institutional input which would aim to sustain the effectiveness of the community. Furthermore, the question of responsibility and funding is important and would require new approaches in institutional strategies.

7.4.2 Organisational change

Restrictive and inflexible settings. Implementing changes in educational institutions would require several levels of decision makers as well as teaching actors to share motivation and opportunity for implementing the change. Kennedy (2008) describes experiences from a 2-year project, which encountered a number of obstacles to realising new media's potential for personalisation. These include the under-resourcing of the school and college, in terms of both technical equipment and staff. The absence of a systematic approach to training staff acted as a barrier to students' access to the learning environment. So did the complicated technical infrastructure at the school site. A mismatch between actual, pick- and-mix curricula used in the trial sites and the e-learning developers' assumption that a more systematic approach to following schemes of work would exist were other obstacles. The culture of accountability in education, and the subsequent imperative to gather evidence on student achievement occupied staff time so that they were not always available to implement the learning environment. The study showed that personalisation of learning is not a straightforward process, and neither is the conversion of new opportunities from potential ones to actual ones. Also other studies suggest that restrictive curricula and assessment requirements, lack of teacher training and support, and lack of incentives for different stakeholders in the institutions are hindering transformative developments in educational institutions (Ala-Mutka et al., 2008a).

Changing power structures. Jameson et al. (2006) observe that educational institutions are slow to change leadership styles to accommodate the distributed, flexible and democratic partnership requirements of e-learning projects trialling new software, tools and learning innovations. When distributed team processes are consciously evolving into the development of a wider, intentionally designed community of practice (CoP) for e-learning, this can prove to be a challenge to existing institutional hierarchies. Based on two 2005-2006 UK eLearning pilots, Jameson et al. argue that to improve practice in e-learning in team-based lifelong learning projects, proactive team working, collective learning and shared knowledge developed in a distributed-coordinated collaborative leadership model is more effective than traditional leader-centric, authority-based approaches. New organisational models are needed for changing hierarchical institutions into dynamic organisations which can reflect and learn from their actors, and thereby also better link with relevant learning opportunities outside traditional models. Furthermore, the institutions need to share and network with each other and other different organisations. Cedefop (2008) emphasizes that new partnerships are

very important for identifying aims and objectives with learning outcomes approach for different levels in the education system.

Resistance for change. Linking social learning approaches in online communities with formalised education paths would require many changes in the existing educational institutions and practices. Experience this far shows that despite the increasing use of ICT for education, institutional practices have not changed (e.g. Punie et al., 2006b), meaning that the transformative potential of ICT has not had a similar effect on education as it has on other sectors (European Commission, 2008c). As a case study, Blin and Munro (2008) analysed the transformation of teaching practices following an institution-wide deployment of Virtual Learning Environment at their university. Little disruption of teaching practices occurred as the VLE was mainly used for administrative purposes, to disseminate resources or information and to complement or replicate existing practices. They suggested that the lack of transformation of teaching practices can be partly attributed to the lecturers' lack of appropriate competencies, but there was also a need for more radical transformations of the overall social and cultural context of the university teaching practices. People feel pressured to preserve traditional practices associated with professional norms while responding to the attractions of new ways of working and learning (Chu & Robey, 2008). There are also tensions between the safety of known procedures within existing institutional hierarchies and the risky benefits of new ventures, as discussed for example in the work by Pór (2004) on innovation and communities of practice.

7.5 DISCUSSION

Although learning in online communities also indirectly benefits people outside the communities through offline interaction, the most and diverse benefits are experienced by those who are participating and developing the communities further. Increasing participation in lifelong learning is a major challenge in general, and although online communities have important potential for providing personalised learning paths, not everyone is in a position to benefit. Significant shares of people do not use internet, especially those who have lower levels of education and would be a major target group. Furthermore, as there exist many types of communities on different topics and activities, it may be difficult to find suitable ones to match personal interest and learning preferences.

With the broad range of internet activities and tools available, users need a level of digital competence which includes versatile skills beyond basic ICT use. Permanence and broad visibility of online actions make online environments different from offline learning settings, causing risks for one's personal privacy. Critical media literacy skills are essential for evaluating the reliability and value of information and resources, which in an online environment is much more the responsibility of each individual user, although community interaction can support these meaning makings. A major challenge is to equip all people with the digital skills needed to start safely participating in these communities, and develop their skills further with community collaboration. The usability and suitability of the technology for the purposes of the community and participants plays a major role in participation activities.

In addition to tools, it is important that communities possess a culture that accommodates participants with different knowledge, interests, learning styles and capabilities, helping them to integrate into the community and learn in a personally meaningful way. Many learners need guidance, and in online communities, this should be provided with the rules, roles and tools of the community, relying on peer effort and assessment. Finding scalable and sustainable models for ensuring learning quality in self-organising learning communities is a major challenge. These need to be linked with the development of validation systems for non-formal and informal learning, which would identify and make visible different relevant learning outcomes (knowledge, skills, or competence). These could guide individuals in their efforts, if they intend to learn in informal settings.

Overall, there is a lack of awareness (among organisations and people) of the potential for learning in online communities. These social contexts reflect current topics of interest among students at schools and universities, workers at the workplaces, and citizens in the society, supporting learning

contemporary and relevant skills and knowledge. Educational institutions could benefit from linking their approaches with online communities. Furthermore, participation in online communities could improve students' skills and interest in lifelong learning. However, this would require new ways of thinking about objectives, management, funding and about where the borders lie between organisations or educational institutions and their environment. Overall, there is little research literature on learning in informal online community settings or on combining it with formally-certified learning objectives. Research is needed to gather evidence and suggest value propositions for institutions and the different actors and stakeholders, in order to encourage them to change their practices and support them in doing so.

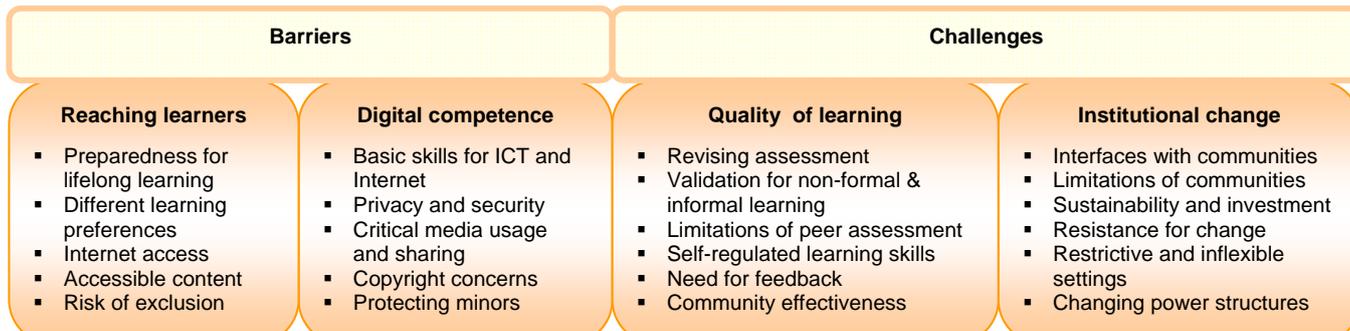


Figure 16: Barriers and challenges for benefiting from learning in online networks and communities

8 CONCLUSION

Lifelong learning should be considered a necessity rather than a luxury for living and working in the European information society. However, wide participation in it has not become a reality despite the political endorsement and the needs of industry to have people with new skills for the new jobs. Cedefop (2008) forecasts that the qualification structure of jobs in Europe will have changed significantly by 2020 and there will be a high demand for qualified employees. This requires training of the working population, as the young generation entering the labour market will not be able to fulfil all the labour market skills needs in the next decade. Therefore, there is a very real need for lifelong learning, which also demands that learning that takes place outside traditionally recognised formal educational systems be made more visible. Educational institutions need to take the online world and emerging networks into account, and prepare students and workers to benefit from them for their lifelong learning.

Self-directed and regulated learning is the dominant form of lifelong learning, but, as Fischer and Sugimoto (2006) put it, the power of the unaided individual mind is highly overrated. Innovations and creative individuals are not fostered in isolation; learning and creativity are nurtured in interaction and collaboration with other individuals, in situations where learning can become a part of life. After initial formal education, individuals may have specific training periods, but learning also takes place continuously in work and leisure activities. Participation in online networks and communities provides social support for learning on topics related to the community scope and activities, partially as a side effect of the participation. Communities can play an important role in guiding the professional and personal lifelong learning of individuals after and outside their initial formal education. The emergence of technologies supports community formation by enabling the emergence of a large variety of communities and new ways for people to reach and collaborate in them. However, in order to encourage intentional and effective learning in these informal settings, people need skills and support for managing their learning trajectories through the many different community opportunities available. There is also a need to develop assessment and validation systems for different types of relevant learning outcomes, for formal education as well as for learning outcomes coming through multiple non-formal and informal learning routes.

This report aims to shed light on aspects which are important for lifelong learning in online communities. This is an interim report on the project. It has gathered issues for discussion in an expert workshop (31 March -1 April 2009), and highlighted those aspects, which should be studied further. As there is very little literature on learning in informal online settings, a wide variety of resources were drawn on for a review which cannot be claimed to have been exhaustive, as this area combines so many perspectives and new developments are emerging daily. However, the review touched on the most relevant aspects. The report cites examples which demonstrate that ICT affords communities important pedagogical, social and organisational opportunities, which promote new ways of learning.

Each chapter of the report contains a summary of its main messages in both written and graphic format. Not all of these messages are included in this final chapter, which concentrates instead on the main conclusions for policymakers and for the further development of the study. Taking into account the main objectives emphasized in the updated strategic framework for education and training towards 2020 (European Commission, 2008g), it is suggested that:

- Education and training policies should seriously consider the potential of bottom-up online networks and communities for learning. Overall, people of all ages are spending a significant amount of their time in the online collaborative settings, and efforts to acknowledge the learning achieved there would benefit everyone. Online networks and communities could be a key tool for the *lifelong learning continuum* with personal learning paths and supporting mobility, starting from linking communities to initial formal education and continuing learning with them afterwards. People need to be prepared and supported to develop their individual learning trajectories by active participation in these learning opportunities.

- Online networks and communities can provide social and targeted environments for different types of learning outcomes contributing to all key competences for lifelong learning. Learning with online communities of practitioners can *effectively* provide *relevant* knowledge needed on the field. Furthermore, learning in communities also develops collective knowledge, which contributes to the profession. New skills for new jobs can be learned in new ways. Developing definitions for learning aims and objectives for different contexts could support validating informal and non-formal learning, and guide learners themselves to identify goals and assess the progress of their learning.
- The great diversity of existing networks and communities can support different types of learners and different learning outcomes. After initial barriers for access, skills and attitudes for participating in lifelong learning in online settings have been overcome, the diversity of opportunities and ICT affordances for personalisation can support *equity and active participation* in new ways. However, here specific attention is needed for those lacking interest, self-efficacy, opportunity, or skills for participation and learning, as they need support to get started. There is a risk of excluding those already less privileged, and who would need the learning opportunities most.
- A personalised approach to learning in social environments and versatile tools for productive activities can nurture *creativity and skills for innovation*. Dynamic networks and communities also develop themselves based on the learning of the individuals, sharing and creating innovations. Deploying community models inside educational systems and linking institutions with external networks and communities could enhance the *innovative capabilities* of the educational institutions in new ways.

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Abstract

This report is part of a project launched by IPTS with DG Education and Culture to study the innovations for learning, which are emerging in the new collaborative and informal settings enabled by ICT. The report gathers and analyses evidence from learning opportunities that are emerging in ICT-enabled networks and communities. In these new virtual spaces, participation is motivated by an interest to a topic, by creative production and by search for social connection. Online networks and communities emerge both within and across organisations as well as in a completely open and bottom-up manner. Accessing, following, and contributing to the communities can lead to a range of learning outcomes. New technologies afford tools and means for people to participate in communities in a personally meaningful way. However, not all individuals are necessarily equipped with skills or knowledge to benefit from these opportunities for their lifelong learning. Major challenges relate both to the initial barriers for accessing online communities with confident and critical digital competence and skills for self-regulated learning. Finding ways to identify, assess and certify relevant learning and new skills that can be obtained and practised in these environments is a major task. The report argues that educational institutions should find ways to connect with and learn from these new learning approaches and settings in order to bring about their own transformation for the 21st century, and to support competence building for new jobs and personal development with a learner-centred and lifelong perspective.

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