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Learning in Informal Online Networks and Communities

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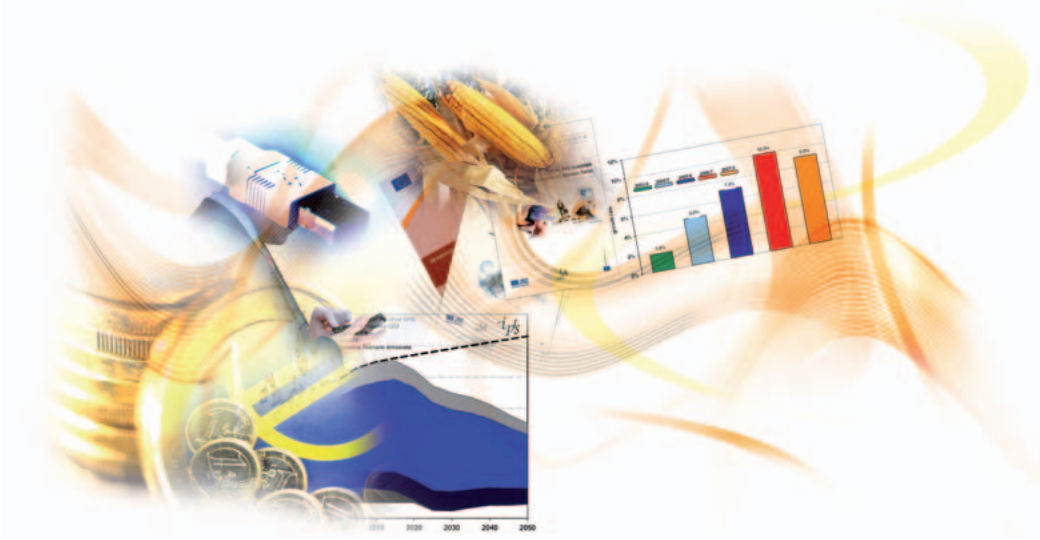

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Executive summary

In 2008, as part of their policy support activities, IPTS and DG Education and Culture launched a study to explore the innovative social and pedagogical approaches to learning that are emerging in new ICT-enabled collaborative settings. On the basis of desk research, literature and resource review, case studies and expert consultations, the study has developed several research outputs and publications, which contribute to:

- providing an overview and understanding of new learning communities that are characterised as socially and pedagogically innovative, identifying the innovative dimension;
- providing an overview and analysis of novel learning and teaching approaches and strategies based on active learning approaches in these communities;
- investigating the specific role and contribution of ICT in developing and enabling new collaboration models which bridge various learning settings (formal, non-formal and informal);
- analysing the relationship between ICT, learning and innovation in view of changes in the delivery of learning;
- proposals for further research and policy-making.

This report is the final report of the project. It synthesises the overall research results, discusses their implications and makes suggestions for the various stakeholders in education and training.

Study context

Lifelong learning plays a crucial role in society today as jobs and the skills required for them are changing. By 2020, the qualifications needed for jobs in Europe will have changed significantly, and the demand for qualified employees will have increased. The working population needs training, as the younger generation entering the work force will not be able to fulfil all the labour market skill needs over the next decade. Strategic objectives for Education and Training in Europe until 2020 emphasise the importance of lifelong learning. Among the many key competences required for lifelong learning, new skills for innovation and transversal competences are important, and digital competence plays a key role. All actors in the Education and Training systems need to transform and develop their practices in order to support equity and lifelong learning for citizens and the society.

Recent technological and social developments in online settings have the potential to support lifelong learning in new ways. Social technologies have seen an unprecedented take up. They are used for various purposes by different groups of citizens, and are also being appropriated for new social activities. Through online spaces, citizens can access resources, follow, interact, and create with people globally. They can connect with each other ad hoc for a specific question or task, or for longer lasting collaboration. Traditional location-based communities are losing their significance for many individuals who have created their personal mobile community through networks. Online spaces enable individual activities within the networked environment and also promote engagement in communities where the members interact with each other with shared purposes, policies and platforms. These spaces are reaching a large share of the population and could provide a new environment for lifelong learning.

New ways and outcomes of learning in online networks and communities

Online collaborative spaces can support both intentional and non-intentional learning in new ways through various forms of participation. The main motivations for participation and activities that take place in online networked environments relate to interest in a topic, to carrying out a task or producing an output, or to social connection. Learning often takes place in these activities as a side effect, rather than an objective. Through the various socialisation activities and tools provided by platforms and communities, people can follow and observe the lives and experiences of others, leading them to reflect and develop. Social technologies facilitate various collaborative initiatives, which provide people with open access to knowledge and new opportunities to learn skills for productive activities, through participating in the production process with others in different roles. Different participation activities facilitate active knowledge construction, social and situated learning, and learner-centred learning trajectories supported by informal and implicit learning.

Online platforms, networks and communities support learning all the key competences of lifelong learning, including new transversal skills and personal growth in a social context. They provide resources to learn about various topics, and the opportunity to learn knowledge through application experience within a task-related social context. This facilitates holistic learning of knowledge, skills and professional competences (attitudes), developing them together with other learners, practitioners and stakeholders. Learning is not limited to certain previously-codified knowledge but develops and can be negotiated with others, therefore becoming both social and individual learning. This networked and collaborative way of learning facilitates innumerable individual learning paths, shaped by the individuals and the communities they participate in. Online spaces provide learners with new ways to build, explore and develop both their personal and professional identities as individuals and as members of particular practices. Through the process of learning and participating, learners build connections and practices for further learning and tasks.

Enablers and success factors for learning in the new collaborative settings

The skills and attitudes of the individuals are important enablers for participation. Enablers for learning in the context of online activities relate strongly to the participation capacity and attitudes of the individual participants. After overcoming the initial barriers, such as limited ICT access and time resources, the basic participation enablers for individuals are their interest in the online platform/community and its purpose, and their digital fluency. If they are to enjoy and learn from the social interaction, individuals need to have communication skills that enable them to listen, express, accept, advise, defend opinions, consider, reflect and discuss with openness to new ideas in the digital environment. The community can support people's participation by having clear objectives and rules, showing the value of the community, providing flexible opportunities for participation and interesting tasks for members at different skills levels.

Individuals need to be prepared for and interested in learning. Not all participation in online activities in networked and collaborative settings leads to learning. If individuals are to make constructive contributions and learn from the processes and products, they need to be creative, produce, negotiate, receive and give comments and get engaged with, and take responsibility for, the community purpose. These are qualities that can be developed further through participation in the community. Specific factors that can enhance individuals' learning in online networked and collaborative environments are 1) broad personal perception of learning and seeing it as relevant to themselves; 2) motivation and interest in learning when

participating; 3) skills for self-regulated learning; and 4) commitment and identification with the community purpose, members and culture.

Communities can encourage their members to participate and learn with a sociable, openly-managed and developing culture. A positive and sociable community with a credible image can play an important role by providing encouraging social interaction and feedback, which contribute to the individual's continuing commitment to participation and learning. The community can take the following measures to assist its members' learning: 1) acknowledge and make visible learning in the objectives and activities of the community; 2) help newcomers and members with technical, topic-based and cultural learning by offering support services and resources; 3) facilitate collective knowledge building, for instance, by moderation and documentation; and 4) encourage and enable diverse membership.

Opportunities and challenges for education and training

Online networks and communities can contribute to all the major European Education and Training policy objectives, i.e. modernising educational institutions to support the lifelong learning continuum with new opportunities for equity, quality and efficiency, and learning key competences and transversal skills. Informal online collaboration and networking provide new tools to complement organised education in creating future learning spaces that enable meaningful and learner-centred lifelong learning in the knowledge society.

Ensuring digital fluency and self-regulated learning skills for all becomes a crucial challenge and enabler for lifelong learning. The opportunity to get engaged in various activities and to observe how other people are doing them, can help both in finding targeted knowledge when needed and in learning through practice in a social environment. However, typically learning in online networking and collaboration does not follow pre-defined paths but very individual activity and learning trajectories. Therefore, it is difficult for learners to show what they have learned and what their state of progress is, should they wish to demonstrate to the outside world the skills they have obtained within the current community. Furthermore, without systematic guidance for learning, there is a risk of misunderstandings and ineffective routes of inquiry, which may even lead to mis-learning. However, as people are increasingly using these environments actively in any case, they should be empowered to make the most of it for their own learning benefit.

A new learner-centred approach for lifelong learning by learners, education providers and employers is needed. There needs to be a change in thinking about lifelong learning so that it is more from the learner's perspective, rather than the learning providers' perspective, which emphasises planned educational situations and activities. Three major needs for change as regards learners, education providers and employers are:

- learners should be better empowered and enabled for lifelong learning with all available learning opportunities;
- the efficiency and relevance of education provision and learning support should be improved to better take into account the digital and social reality in which learners and citizens live;
- there should be a shift from certifying education to validating learning outcomes, which would help to identify, pursue and demonstrate competences and skills for different purposes.

Policy implications and suggestions

All education stakeholders (students, teachers, workers, citizens, organisations, and educational institutions) should engage in developing lifelong learning opportunities through collaboration and new partnerships. All

learners, whether they are at schools, universities, vocational or professional education, learning at work or while doing any other activities, should be empowered to also take part in informal online networking and learning opportunities. They should be equipped with the skills, awareness of, and interest in, lifelong learning so that they can benefit from all forms of learning opportunities in the various relevant social environments. This requires support from the learning and working environments, which should enable and encourage the actors involved to innovate and learn, reaping the benefits that informal networking both inside and outside organisations can offer. Communities can improve their quality and participation by supporting the value and learning they provide for their members. Establishing new partnerships between organisations, communities and interested individuals through online collaboration can provide benefits for all.

At national level, Member States should develop and enable locally-adapted actions that support European objectives for Education and Training. This study makes the following policy suggestions:

- Educational institutions should empower teachers with an innovation space that allows experimentation and development of new practices;
- Educational institutions should empower and enable actors to network within and outside institutions, establishing partnerships with relevant communities, in ways that benefit learning and education of the teachers and students;
- Member States should develop initial and in-service teacher training, in terms of modernising both content and strategies to encourage continuing participation;
- Member States should develop national curricula which take into account the new ways for learning with ICT and the new skills needed for jobs and lifelong learning, from the early stages of education;
- Member States should develop, implement and share practices in collaboration with stakeholders for validating learning outcomes following the European Qualifications Framework.

At European level, measures and regulations are important to guide and support common approaches for the Member States, and to ensure the rights of the citizens in the digital environment. The following suggestions are made for enabling learner-centred lifelong learning through social and individual learning spaces and resources on the internet:

- Measures to improve ICT access and reduce disparities in ICT skills are still needed, especially in poorer regions and groups at risk of exclusion. Partnerships between ICT-based networking activities and local communities could provide new opportunities to engage these groups;
- European-level networking, sharing and development of practices and results should be encouraged to develop common guidelines and example resources for educational organisations;
- Research funding instruments should encourage the exploration of the limitations and pedagogies for benefiting from learning in informal collaborative settings, and how to best combine these approaches with organised education;
- Common regulations and recommendations should be developed to guarantee the rights of the citizens to manage their own data, and to provide secure and interoperable solutions for managing digital identities.

Overall, these new social technologies and approaches provide important new ways to develop learning and improve quality of life, emerging from the initiatives and innovations of the citizens themselves. It is important that institutions and policy makers engage with these initiatives and environments in order to find the best ways to open up and modernise their own processes for the 21st Century Learning Society. Furthermore, it is crucial to ensure that all citizens are empowered to participate in these opportunities safely and productively.

1 Introduction

Social computing applications have seen unprecedented take up. They enable collaborative use of internet through blogs, wikis, social bookmarking, virtual worlds, podcasts, RSS feeds and an opportunity for Internet users to easily launch new social and collaborative approaches with these tools. Recent data captured between December 2007 and December 2008 by Nielsen Online (2009) shows that two-thirds of the global Internet population visit social networking or blogging sites. These activities account for almost 10% of all Internet time, and are overtaking the time used for personal email applications. Time spent on social networking and blogging sites is growing at more than three times the rate of overall Internet growth. Furthermore, although many social computing activities started out among the younger people, they now attract older audiences as well (Pascu, 2008; Nielsen Online, 2009). People from all age groups are participating in different types of online networked activities, which can support work, learning, and citizenship (Ala-Mutka, 2008).

Online collaboration and networking is a significant phenomenon, which has enabled new ways of accessing and participating in communities. IPTS has been studying the challenges and opportunities of ICT for learning, innovation and creativity through several research projects as part of its policy support activities.1 In order to explore the impacts of social computing on learning, IPTS launched two projects with DG Education and Culture: The Impact of Web2.0 Innovations in Education and Training,[2] which focuses on formal education, and Innovations in New ICT-facilitated Learning Communities3 which explores the emergence of learning in informal settings. This report is part of the latter project, where the main research question is: what contributes to the emergence and success of learning in ICT-enabled communities and how can they promote quality and innovation in lifelong learning and education systems in Europe?

1.1 Scope and objectives of the study

This project aimed to review and assess the innovative social, self-organised 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, to investigate the contribution of ICT in enabling new collaboration models, to analyse the relationship between ICT, learning and innovation, and to propose avenues for further research and policy-making. The project approached the above mentioned overall research question by considering the following issues:

- ***What is a learning community?*** New tools and technologies are allowing new types of collaboration and practices to emerge. One of the goals of this research is to study what makes them spaces for learning. What constitutes a learning community, where people actively participate and learn? What are the critical factors in creating, maintaining and sustaining learning communities? Are there significant differences in short-term, ad hoc vs. planned and organised communities?
- ***How do people learn in these communities?*** Different theories and approaches have been proposed to explain why and how people learn when they interact with each other in communities. This research aims to study

1 An overview of the IPTS research on ICT for learning: http://is.jrc.ec.europa.eu/pages/EAP/eLearning.html
2 http://is.jrc.ec.europa.eu/pages/Learning-2.0.html
3 http://is.jrc.ec.europa.eu/pages/EAP/LearnCo.html

how learning and mentoring is actually happening in emerging communities. How are learning, mentoring and recognition of learning taking place in learning communities? What are the factors for success and failure for providing valuable learning in the communities?

- ***What is the role of creativity and innovation in online environments?*** With new ICT, communities can arise and form easily around an idea or innovation and the creative experience of joining forces in virtual space through new technologies can foster further innovations. As policies emphasise the need for more creativity and innovation in economy and society, this study aims to analyse how these skills emerge in learning communities. Do learning communities encourage and employ creativity? How do they support the emergence of innovation in learning and skills for innovation?
- ***Do learning communities support equity?*** Learning communities provide the potential for learning in all phases of life and for all groups of people. This research aimed to study how this potential can be deployed. When, and under what circumstances, do learning communities gather learners from different phases of life and individuals from different environments? Under what conditions do they enhance equity? What factors enable or hinder learning communities to successfully mix with and increase access to institutional learning?
- ***What are the challenges for ensuring that learners benefit from participating in ICT-enabled learning communities?*** New learning communities incorporate new models and tools for learners, teachers and organisations. This study aims to recognise and discuss the main challenges and bottlenecks related to this process. What are the challenges for accessing the communities? What skills and competencies are necessary for participants in different roles? Who should provide them? How should learning assessment and recognition systems change in order to benefit from learning in communities?
- ***What role does ICT play in learning communities?*** By definition, the study concentrates on new ICT-enabled learning communities. Some of them have emerged with the help of ICT and others may have a community history without ICT. This study looks at the role ICT plays in the formation and functioning of learning communities. What added value can ICT offer learning communities? Which technologies are the most suitable for particular needs and circumstances? How can the most appropriate platform and online system be chosen?
- *What are the challenges and opportunities for policy?* As recognised by policy documents and several studies, it is necessary to modernise education systems to better support innovation and lifelong learning. This study aims to formulate what lessons can be learned from informal learning communities for developing education and training systems to accommodate and benefit from the new learning models and approaches. Furthermore, it studies the challenges and opportunities provided by the existence of learning communities for educational systems and lifelong learning in Europe.

The above questions were the starting point of the research, reflecting current thinking at that time. After the research began, however, it became clear that the scope and terminology of the study had to be reconsidered. The Internet enables an online environment which includes communities, networks, resource platforms, collaborative applications and many types of connecting technologies. These facilitate the emergence of networked individuals and online communities, and learning can take place in many individual, networked, and collaborative activities. Therefore, it was decided that discussing learning only in community frameworks ('learning communities') was not meaningful, and that the many different setups that are enabled by ICT and the internet should also be taken into account. From this point

forward, when the report addresses communities, they are identified as such. Most of the time, the report aims to address networking, collaboration and collective activities, which can take place either in a network or a community. The focus is on the individual learner, and the surrounding network, application environment or community is considered from the perspective of what support it can provide for the learning of the individual.

1.2 Methodology

The structure and approach for this project was defined by the IPTS IS Unit ICT for Learning team in collaboration with DG Education and Culture and documented in the technical specifications for the study. Broadly speaking, the project was composed of the following elements:

A literature review and analysis of research, data and resources relating to learning in online informal collaborative settings:

- A review of resources was carried out through iterative searches using terms relating to informal learning, communities, collaboration and internet technologies in scientific databases and on the internet, by browsing relevant policy reports and papers, and by following recent resources on the internet and recent issues of major scientific journals on educational research.
- The information content obtained from the review was gathered and structured, with the help of mindmapping software, in order to recognise key issues and topics.
- The draft report was sent to DG EAC and to 3 external experts for review. It was also discussed at an expert workshop. The comments and suggestions received were integrated into the final version of the report.
- The results were published as a JRC scientific and technical report: Ala-Mutka (2009).

In-depth case studies of 12 communities:

- 12 communities were selected and approached, with a view to covering all the different types of activities and communities recognised in the review phase.
- Community study methodology was developed, taking into account the issues that arose in the review. The methodology kit contained community activity observation, narrative content analysis, interviews and surveys with community members and managers.
- Cases from each individual community were described, and the researchers developed an overall assessment of the lessons learned from these examples of learning in online communities.
- The draft report and results developed by Scienter were reviewed by IPTS and discussed at an expert workshop. The comments and suggestions received were integrated into the final results of the study.
- Final results will be published as an IPTS technical note: Aceto et al. (forthcoming).

Validation workshop with experts, to discuss the above two elements and develop further insights:

- Workshop experts were sent the intermediate research results beforehand and these were also briefly presented at the workshop for comment and discussion.
- An additional session was organised to discuss the relevance of Communities of Practice for learning and this study.
- The discussions and presentations were recorded and the notes on the workshop outcomes were sent to the workshop participants for validation and comment.
- The main messages raised in the workshop discussions will be published as an IPTS technical note: Ala-Mutka (forthcoming).

Synthesis and analysis of the research results, leading to the publication of this final report on the project.

- Subsection 1.3 explains the structure and sources for the content of this report. The report has been prepared mainly by one author, but with comments from, and in collaboration with, other researchers. The draft report was sent to DG EAC and 3 external experts for review and their comments have been integrated into the final version of this report.

All the research reports of the project, with more detailed descriptions of the content and outputs of each phase, will be published on the project website http://is.jrc.ec.europa.eu/pages/EAP/LearnCo.html

1.3 Structure of the report

As mentioned above, this is the final report of the project, which synthesises the results from different elements and phases of the study. The different chapters draw from the research results as described in Table 1.

Table 1. Content and research elements for the chapters of the report

Chapter	Main content	Results and content drawn from:
1 : Introduction	Description of the rationale and implementation of the study	Technical specifications of the study
2 : Study context	Overview of the policy context, technological trends, and learning theories and concepts setting the stage for the study	Literature and resource review
3 : Emergence of learning in the new ICT-enabled settings	Description of the settings, activities and factors recognised to contribute to learning in the networked informal online settings	Literature and resource review, case studies, expert workshop
4 : Opportunities and challenges for Education and Training	Discussion of the opportunities and challenges for E&T in tapping into the learning models of networked informal online settings	Literature and resources review, case studies, expert workshop
5 : Implications for Education and Training stakeholders	Policy options and recommendations for action by different levels of stakeholders	Literature and resources review, case studies, expert workshop, overall synthesis
6 : Revisiting research questions	Showing the contribution of the study to the original research questions and outlining future research needs	Overall synthesis
7 : Conclusions	Highlighting the main messages of the study for policy audiences	Overall synthesis

2 Overview of the context

The review report developed earlier in this research project (Ala-Mutka, 2009) gives a broad overview of the policy background and relevant pedagogical theories and concepts for learning in networked online settings. This chapter summarises the most relevant policy aspects, technological developments and pedagogical concepts for the study.[4]

2.1 Policy framework

Strategic objectives for Education and Training in Europe until 2020… In May 2009, the Council of the European Union adopted a strategic framework for European cooperation in education and training ("ET 2020").[5] The strategic framework continues with the objectives set in the Education and Training 2010 Work Programme[6] in the context of revised Lisbon strategy (European Commission, 2005a), which aims to make Europe the most competitive and dynamic knowledge-based economy in the world. Education and Training have a crucial role to play, and efficient investment in human capital is needed in order to deliver knowledge-based growth and jobs, at the same time promoting personal fulfilment, social cohesion and active citizenship. Specifically, the framework aims to address the following four strategic objectives:

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

… emphasise the importance of lifelong learning. European cooperation in education and training should be implemented in a lifelong learning perspective, drawing on the four strategic objectives above, common reference approaches, peer learning and exchange of good practices and dissemination of outcomes,[7] periodic monitoring and reporting, evidence and data from European and international bodies, and making full use of Community programmes.[8] The Council conclusions state that lifelong learning should be regarded as a fundamental principle that covers learning in all contexts - whether formal, non-formal or informal - and at all levels: from education in early childhood and schools through to higher education, vocational education and training, and adult learning. In April 2008, the European Parliament and the Council (2008) adopted a common European reference framework (European Qualifications Framework, EQF) for specifying interoperable requirements for learning outcomes on different levels: knowledge (theoretical or factual), skills (cognitive and practical), and competence (responsibility and autonomy). This framework provides an opportunity to acknowledge and accredit learning outcomes, whether they result from formal, non-formal or informal learning pathways.

Several key competences have been identified. The European Framework for Key

4 For more information on these aspects, see Ala-Mutka (2008) and Ala-Mutka (2009), and other IPTS reports on social computing: Cachia (2008); Osimo (2008); Pascu (2008); Punie (2008); Redecker (2009).

5 http://register.consilium.europa.eu/pdf/en/09/st09/st09845.en09.pdf

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

7 See the current peer learning Clusters at http://ec.europa.eu/education/lifelong-learning-policy/doc32_en.htm

8 See the Lifelong Learning Programme, http://ec.europa.eu/education/programmes/llp/index_en.html

Competences for Lifelong Learning (European Parliament and the Council, 2006) identified and defined, for the first time at European level, the different key competences that are required for lifelong learning, to enable 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.

New skills and transversal competences are important. Many of the key competences overlap and interlock. Common themes include: critical thinking, creativity, initiative taking, problem solving, risk assessment, decision taking and managing feelings constructively play a major role in all eight key competences. These are important new skills that need to be taken into account for working in a rapidly changing knowledge society. The Commission Communication (2008f) on New Skills for New Jobs[9] calls for the education, training and employment policies of the Member States to focus on increasing and adapting skills in order to develop a workforce that is highly skilled, adaptable and responsive to the needs of the economy. The year 2009 has been named the European Year of Creativity and Innovation[10] for emphasising creativity, through lifelong learning, as a driver for innovation and as a key factor for the development of personal, occupational, entrepreneurial and social competences and the well-being of all individuals in society (European Commission, 2008b).

Digital competence plays a key role. Digital skills are considered to have a key role for learning, working and living in the information society, and they are emphasised in several policy documents, such as the Communication on Media Literacy in the Digital Environment (European Commission 2007c), on eSkills (European Commission, 2007d), and as a key competence for lifelong learning (European Parliament and the Council, 2006). Digital competence is defined as including several skills, relating to various areas of life: "the confident and critical use of Information Society Technology (IST) for work, leisure and communication, which 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".

Equity remains a challenge. Equity continues to be a challenge for 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). European i2010 initiative on e-Inclusion (European Commission, 2007b) emphasises 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, 2005b), and tackling gaps in the digital competence and the motivation of individuals to acquire and use such competences.

All actors in the Education and Training systems need to transform and develop their practices. Various Commission communications have encouraged education and training systems to support lifelong learning and promote new skills. Universities are encouraged to face more directly the challenges and grasp the opportunities presented by the lifelong learning agenda in the Commission Communication on modernising universities (European Commission, 2006). The Communication addressing schools for improving

9 See New Skills for New Jobs initiative at http://ec.europa.eu/social/main.jsp?catId=568&langId=en

10 See the web site of the European Year of Creativity and Innovation at http://create2009.europa.eu/ and the Manifesto for Creativity and Innovation at http://create2009.europa.eu/about_the_year/manifesto.html

key competencies (European Commission, 2008e) emphasises the need to prepare pupils for the 21st century. The Commission Communication on teacher education (European Commission, 2007a) brings up 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. The European Commission (2008c) Staff Working Paper points out that ICT has potential to support innovation and lifelong learning, but this has not yet been realised, despite the increasing take up of technological tools.

2.2 New connections, resources and activities enabled by technologies

As recognised in the policy documents, technologies play an important role in people's lives and work. According to the recent Youth Net report (Hulme, 2009), 75% of 16-24 year-olds claimed they could not live without the internet; 84% considered that the internet brought communities of similar people together; 82% of young people surveyed said they had used the internet to look for advice and information for themselves, with 60% stating they had looked for information for someone else. Young people have grown up with technologies and use the internet naturally to connect with people and information when needed. At home, they use it even more often than at school. OECD (2008) found that, according to the PISA 2006 survey, while 86% of pupils aged 15 frequently use a computer at home, 50% of students in countries belonging to the European Union declared that they had not used a computer in the classroom in the past 12 months.

Social computing applications have seen especially high take up. They enable collaborative use of the Internet through blogs, wikis, social bookmarking, virtual worlds, podcasts, RSS feeds, media sharing, social networking sites and the opportunity to easily launch new social and collaborative approaches with these tools. The term social computing is used in this report for referring generally to the collaborative and networked use of social internet applications among individuals and organisations. These new technologies and user-friendly applications empower users to create and to participate in collective and collaborative activities without high initial skills requirements.

2.2.1 Wide and intensive take up of social internet technologies

Social computing tools are used by the majority of Internet users. Currently, a majority of global Internet users (67%) accessed social networking sites or blogs according to a recent Nielsen Online (2009) report. According to Comscore (2007), 127.3 million 15+ European Internet users (56% of the European online population) were already using social networking sites in 2007. The share of social tools seems to be high in countries with both high and low general internet penetration. For example, in 2008 internet access by households in Hungary was lower (48%) than the EU27 average of 60%, but 22% of Hungarian internet users used the internet for posting messages to chat sites, newsgroups or online discussion forum, while the EU27 average for these activities was 16% (Eurostat data). Nielsen Online (2009) found that Brazil has the highest figures for 'accessing member communities', as these activities accounted for one of every four minutes spent on the Internet, as opposed to the global average of one in every 11 online minutes.

Social applications are becoming major internet activities. Overall, social networking and blogs already count for more Internet time than personal email applications (Nielsen Online, 2009). Measurements and surveys suggest that though there are, of course, people who try and then discard these social computing approaches, there are many who use and participate in them quite intensively. 48% of teenagers in the US with profiles in social networking sites visit them at least once a day (Lenhart & Madden, 2007).

Vie (2008) found in her study that 62% of college students visited social networking sites at least daily. Also, 51% of workers use social computing applications at least once a day (Facetime, 2008). The major sites have significant Internet traffic, for example YouTube ranks as 3rd globally in Internet traffic (Ala-Mutka, 2008).

Various groups of people are participating... The data shows that it is no longer only young people using the sites, but also older age groups. In the US, 53.6% of Wikipedia entry editors were over 45 in June 2007 (Tancer, 2007). In fact, the largest growth in usage now comes from older age groups. For example, from December 2007 through to December 2008, the greatest growth in Facebook, a leading global online social networking platform, has come from people aged 35-49 (+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 number of under 18 year old visitors (+7.3 million). There are also examples showing that the groups often considered at risk of exclusion are utilising social internet tools for maintaining and developing their communities and ambitions, e.g. immigrants (Maya-Jariego et al., 2009).

... which is resulting in a large amount of collaboratively-created resources. The current opportunity for a large number of non-technically trained people to participate has led to a lot of resources being made available, produced and shared by collaborative platforms. In May 2008, Technorati announced that it was tracking 112.8 million blogs, with over 175,000 new blogs and 1.6 million blog posts per day (Ala-Mutka, 2008). In November 2009,[11] Wikipedia had 271 different language versions. The English Wikipedia was the largest, with over three million articles. In addition to article pages, all wikipedias contain a significant number of content-related discussion pages, user pages, and different types of administration pages. For example, the English Wikipedia contained 18.5 million pages in total in November 2009. Furthermore, the 'resources' that people can reach, are not only digital media products, but also groups and communities of other people that can be accessed and interacted with, for example, for receiving information and advice on a specific topic.

The phenomenon is supported by rapidly expanding technology take up. The large rise in the usage of social computing is made possible by increasing internet and broadband penetration, at work and at home. In countries where Internet penetration is high, this means that a significant portion of citizens are present and are communicating on these online spaces. In 2009, 65% of European households had internet access, although this ranged from 30% in Bulgaria to 90% in the Netherlands (Lööf and Seybert, 2009). Mobile technologies are offering new means of access to internet and social computing applications. This is important, as their penetration is much higher than broadband penetration (in most European countries this was already above 100% in 2006, according to Eurostat survey data). Many people without internet access at home have a mobile phone in their pocket. All age groups are increasing their internet usage, although biggest shares are among young and highly educated people. In 2009, 92% of 25-54 year-olds in the EU27 with high formal education used the internet on average at least once a week, while only 40% of those with no or low formal education did so (Lööf & Seybert, 2009).

2.2.2 Diversity of usage and motivations

Online environments gather people with different levels and types of activity. Although many people access social platforms, their activities vary. It seems that the more creative and effort demanding the contributions are, the smaller the share of contributors is. For example, Forrester Research reported that of the European online public, 9% participates in publishing, 18% in commenting, and 49% in reading activities,

11 Based on http://meta.wikimedia.org/wiki/List_of_Wikipedias, accessed 6 November 2009.

with large differences between countries (Kemp, 2007). Typically, only a small share of participants in a specific collaborative environment is responsible for most of the contributions (Bughin, 2007; Ochoa & Duval, 2008). According to Hitwise, only 4.38% of all Wikipedia visits in the US result in content editing (Tancer, 2007).

People can have different motivations for participating. Surveys show several types of motivations for participating in online social networking and collaboration. Ala-Mutka (2008) reviewed surveys implying that individual creation, sharing, and then socialising through commenting and new creations with media sharing applications (such as YouTube) are especially appealing to younger audiences. Older people appeared to participate more often in informative and communicative applications, such as Wikipedia and blogs, which allow sharing knowledge and creating content-based discussion. Young people often use social media and social networking, because they want to connect with their friends and the online platform serves as an extension to their offline lives and connections. Sixty-six percent 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). For respondents aged from 14 to 21, this was the most common motivation (80%), while for respondents aged 50 +, the motivation "to be part of a group or community" scored the highest (42%). While surveys show that young users appreciate social networking and media especially because 'it is fun', and 'friends do so', for the 50+ year-old users, the most common motivations are 'it is useful', and 'to be part of a community' (OCLC, 2007). In work environments, employees participate in wikis, because they want to enhance their reputations, help the organisation to improve its processes, and because they find it useful (Majchrzak et al, 2006).

Various activities, which were previously offline, are now supported in social online settings. Collaborative production over the internet already existed before social computing, although it often took place in more closed communities and required advanced ICT skills for participation. For example, open source software development communities have existed for a long time, showing how personal interests, learning practical programming skills, collaborative production and also economic benefit can be combined. However, social computing tools are also making it possible to extend many offline activities to online settings. For example, social networking sites often connect people who also know each other offline (Cachia, 2008), extending and complementing their discussions and connections. Examples show how these online networked settings can be used for various purposes. It has been found, for example, that 50% of pupils using social networking discuss schoolwork (NBSA, 2007). 79% of workers say that they use social networks and social media for work-related reasons (Facetime, 2008). Both marketing and political campaigns are also using these channels. For example, funds can be raised through online social networking,[12] citizen organisations are using social approaches to get visibility and participation,[13] and governments can invite users to participate with their contributions.[14] YouTube, Wikipedia and blogging also provide a new means for participative journalism, where citizens can contribute to a news service with their pictures and stories, gaining visibility for the issues they are interested in.

New tools also enable new social activities. In addition to extending existing offline activities, social computing applications are also enabling new activities, and the diversity of usage of social computing applications is continuously increasing. Platforms for social networking and

12 http://www.techcrunch.com/2008/02/04/obama-sets-record-with-january-donations-online-donations-88-of-total/

13 For example, citizens reporting needs to fix streets to council at http://www.fixmystreet.com/, or giving feedback on health services at http://www.patientopinion.org.uk/

14 For example, citizens can contribute to law preparation in New Zealand (http://news.bbc.co.uk/2/hi/asia-pacific/7015024.stm), or launch petitions for the UK government at http://petitions.pm.gov.uk/

media sharing enable various types of activities, and specific networks and communities are springing up around joint tasks, topics and facilities. New initiatives and communities can easily be created by users themselves or by companies and organisations. Applications afford new forms of storing and sharing information on preferences (e.g. social tagging, voting practices), crowd sourcing by gathering the efforts of many for a common specific task (e.g. Peer-to-Patent, emergency initiatives), and developing new collaborative production models (e.g. Lulu, Song Community). Microblogging (Twitter) and various RSS feed-based services allow people to update and be updated on the movements and activities of their contacts and informed about resources of interest. This allows new types of social presence, experiences and different levels of social connections that can be configured by integrating different tools and applications according to one's opportunities and preferences.

2.2.3 New connections, networks and communities

Individuals can dynamically connect with a vast audience. The new opportunities discussed above are empowering individuals to participate in new ways, to follow their individual intentions, but still be a part of a collective activity. Global platforms for media sharing (Flickr, YouTube) are examples of places which allow users to share their individual expressions world wide –and receive replies through commenting facilities. Blogs are another example of individual publishing activities where, however, the discussion facilities and communicating with readers encourages activity, which may become more important than writing the blog (Cardon & Aquiton, 2007). A survey of US bloggers showed that 52% write for themselves and 32% for an audience (Lenhart & Fox, 2006). People have several intrinsic motivations for why they want to create and share publicly. Their motivations (selected either as 'major' or 'minor' in the survey) for blogging were creative expression (77%), sharing personal experiences (76%), and sharing practical knowledge (64%) (Lenhart & Fox, 2006). Cardon and Aquiton (2007) argue that the success of Web 2.0 services demonstrates users' hybrid motivations where the individualisation of the user's goals meets the opportunity of sharing personal expression in a public sphere.

Communities emerge and are hosted in online settings. Online settings provide opportunities not only for loose connections between individuals but also for strong intimate ties, reciprocal relations, emotional support and a sense of belonging, creating virtual communities of people with similar interests and attitudes (Wellman & Gulia, 1999). Preece (2000) defines the 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 law that guide people's interactions; and
- ***Computer systems*** that support and mediate social interactions and facilitate a sense of togetherness.

As reviewed in Ala-Mutka (2009), various social tools and even simple email communication can provide community experience for individuals. Online tools can both extend existing communities, such as professional associations, or establish new communities, such as TuDiabetes, one of the case studies in the project.

People are carrying with them portable individualised dynamic community multi-memberships. As mentioned above, online tools enable a great variety of communities and activities with a global reach. Individuals from different groups and locations have a new range of topics and communities to learn about, with opportunities to participate, connect with experts and build knowledge in collaboration. Location-based communities have changed

into individual-centred personal communities, which are partly maintained online (Wellman & Gulia, 1999). Ryberg and Larsen (2008) suggest that we are witnessing a seemingly paradoxical 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.

Open environments host at the same time individuals, groups and communities. Many online platforms aim mainly at loose socialisation and networking activities, such as social networking sites and media sharing platforms. However, they also enable individuals to create and participate in groups, which can become small communities around a common interest. Therefore, they host both individual users and small groups and communities around joint interests. On the other hand, in any community, one can find people with strong ties and identification, and also people who do not participate actively. Therefore, in this research, the emphasis is not on specific types of online settings, networks or communities, but on individual participation and learning experience. Experiencing a sense of community may have an impact on one's learning-related activities. Furthermore, a group of people with a common purpose and community identity may be able to encourage and support visitors and new members to learn better than they would learn in looser networking settings. These are considered in the next chapter, but in general, the approach uses the term 'networks and communities', without differentiating between them.

2.3 Related learning concepts and theories

The new types of collaboration, communication and activities made possible by Internet and social applications are enabling new learning opportunities for people. These new learning environments are no longer restricted by physical distances and the traditional ways of connecting with and getting to know people and their work. Most importantly, they provide new potential for active knowledge construction in social and situated contexts, allowing learner-centred learning trajectories. This section gives an overview of learning theories and concepts seen as most relevant for exploring learning in these informal networked settings.

2.3.1 Active knowledge construction

Learning involves active knowledge construction. Constructivist theories emphasise the active role of the learner and interaction with the environment. Within this perspective, learning includes assimilation of new knowledge to the existing structures, as well as accommodation of existing knowledge and structures to new situations (Piaget, 1977). 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). This suits the learning needs in the knowledge society, where it is not possible to acquire the facts once and then later apply them, as one needs to be able to construct meanings in changing situations. Learners need to practice these skills right from the beginning of their education.

Experience and reflection promote learning. Consciously thinking about and reflecting on concrete experiences is an important source and form of learning (Schön, 1987). 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 in which 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 experience. Some people prefer concrete experience to abstract conceptualisation, or active experimentation to reflective observation, resulting in different

learning styles. Technologies are enabling communities and networks where people can work, experience and share their reflections either by themselves or together with others. Users can play different roles and participate in ways that appeal to them most.

Technologies enable both individual and social knowledge construction and re-construction in new ways. ICT provides powerful opportunities to construct external objects to reflect upon, which supports thinking and constructing internal knowledge (Harel and Papert, 1991). The new multimedia opportunities and the diverse availability of resources and connections can help individuals to imagine, and make new connections, ideas and creations through drafting and exploring (Loveless, 2007). Furthermore, networked online settings provide individuals with new motivation and opportunities to make their constructions public, and also receive comments and reflections from others. New technologies provide several affordances for social knowledge construction through diverse and rich forms of dialogue and interaction (Conole, 2008).

2.3.2 Social and situated learning

Interaction and contact with experts can enhance novices' learning. Each learner has a 'zone of proximal development' which contains knowledge that the person might not learn independently, but can learn with the guidance of an expert (Vygotsky, 1978). Learning can be seen as being processed from the outside-in: first the interactions take place in social context, and then within the cognitive processes of the learner. Bandura's (1977) social learning emphasises the importance of observing and modelling behaviours, attitudes, and emotional reactions of others. People do not need to learn everything by trying it out themselves, they can learn from observing others. In informal online settings, this is possible on a new scale: people can both participate in active collaboration and learn by observing and following the activities, productions and discussions of experts and peers (Dennen, 2008).

Learning knowledge and skills is situated in a context. Situated learning (Lave & Wenger, 1991) emphasises that learning occurs, possibly unintentionally, in a function of the activity, context and culture. The understanding of content is socially constructed through conversations about that content and through grounded interactions, around problems or actions (Brown et al., 1989). Wenger (1998) defines communities of practice (CoPs) as important places for negotiation, learning, meaning, and identity. Through mutual engagement, joint enterprise and shared resources, novices transform into experts and new practices and knowledge are created by the community. Participation itself can be seen as a process of appropriation and transformation, with social and cultural aspects of knowing - the learner becomes prepared for participation through the process of participation itself (Rogoff et al, 2003).

Learning in the knowledge society is not only about knowledge but also about building connections. Siemens (2006) argued that in an era when learning is impacted by technology, the network itself is the basis of the learning processes. As the knowledge society requires the individual to continuously update his knowledge, this cannot happen as a process of progressive "knowledge accumulation", but through building, maintaining and utilising connections. Here, the opportunities provided by social computing networking applications play an important role. They enable individuals to build personal resources composed of a broad diversity of online networks and weak ties, which can enable continuous exposure to new information, opinions, ideas that are different from their own, and new approaches to problem-solving (Haythornthwaite, 2008).

2.3.3 Learner-centred learning trajectories

Following individual interests encourages and enables learning. Learners' personal goals play an important role for their learning and may conflict with the imposed goals (Boekaerts

& Niemivirta, 2000). Bruner (1961) emphasises the importance of discovery, where the learner enquires and thus 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. Curiosity and interest in the topic stimulate learning. Strong individual interests can even help the learner to overcome low ability and/or perceptual disabilities (Hidi, 2006). However, a certain level of understanding of the topic is needed in order to develop further interest and curiosity about it.

People have different needs and preferences for their learning activities. Kolb (1984) developed a 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 mentioned above, through supporting individual and collaborative activities, social computing tools provide Internet users with a completely new range of resources, both in terms of access to products and connections to people, which support personalising and building individual lifelong learning paths. Learning online can be active production or reflective observation, self-directed activities, or collaborative activities guided by the community. The variety of opportunities allows users to select the resources, communities and activities that match their interests and learning styles.

Learners need skills for self-regulated learning. When the decisions on pursuing activities and learning are the responsibility of learner, motivation and self-regulated learning skills come to the fore. Self-regulated learning 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). Research shows that these skills can be practiced, for example, Dignath et al. (2008) found that self-regulated learning training programmes have proved to be effective even at primary school level. ICT tools can help in reflecting and assessing one's own learning progress and needs, and enhance motivation by providing opportunities for social learning (Carneiro, 2006). However, Kirschner et al. (2006) point out that research suggests that learning with minimum guidance is less effective and efficient than structured and guided learning, especially with low-skilled learners.

2.3.4 Informal and implicit learning

Learning is 'life wide'. 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. 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. Formal and non-formal learning are structured and organised education, but individuals also learn without structure or even without intending to, in the different situations and activities of their daily lives. All this learning is covered by the term 'informal learning'. 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).[15]

Learning and knowledge are not always explicit and visible. Nonaka et al. (2000) discuss the transformation and development of tacit and explicit knowledge with his knowledge spiral model. People possess a lot of tacit

15 This definition is an elaboration based on the definitions given in European Commission (2001) and ISCED97 Glossary http://www.uis.unesco.org/TEMPLATE/pdf/isced/ISCED_A.pdf

knowledge, which may be shared in mutual social collaboration and becomes explicit through specific effort. It can then be shared with different groups in the explicit form, and when it is internalised by people, it reforms and develops into new tacit knowledge. Eneroth (2008) discusses informal knowledge, which is implicit, and difficult to describe in words. It is a 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. Informal learning may be learning explicit facts and easily describable knowledge, but often, as it comes through life experiences, it may be this kind of implicit understanding and improved preparedness for upcoming events.

Informal learning is often difficult to measure. As the informal learning result may be something not easily made explicit, it is difficult to recognise or measure. Informal learning may take place in a way that even the learner may not be aware of. This makes it difficult for those who would like to encourage and guide informal learning. If the informal knowledge and learning process is codified (made explicit) for guiding and measurement purposes, it changes the settings and probably the learning process and outcomes at the same time. Explicit knowledge obtained through whichever learning process can be measured with theoretical or practical examinations. But this is difficult to do with the implicit and tacit part of learning, although it can be observed by confronting the learner with situations where he/she can demonstrate his/her (possibly implicit) knowledge and skills in a particular task. However, guiding informal learning processes in a certain direction is difficult.

Technologies have potential to make invisible knowledge and learning visible. Technological tools can provide information of people's processes and behaviours in ICT-based working environment, making some of the implicit knowledge explicit, and this codified information can be used to guide the learner. Artificial intelligence systems are based on these types of algorithms and approaches, although also they require codification of the intended process outcomes. Social tagging approaches can make expert knowledge visible and transferable. Participation data in community activities can show active participation, and the activity profile can be analysed to evaluate one's contribution to the community product. These are ways to make one's processes and knowledge visible, but there is still the risk that if the evaluation aspect exists, people will consciously consider it in their activities, and the otherwise completely informal processes are changed.

2.4 Discussion

This chapter has given an overview of the context of the study:

- policy objectives for European society, which recognise the importance of enabling efficient and inclusive lifelong learning for work and life in the knowledge society;
- technological developments, which are changing the way people are working, living and participating, and enabling new social phenomena and innovations to emerge;
- theories and concepts about learning, which are now enabled by technology in new ways.

Social technologies have seen unprecedented take up. They are now used for various purposes by all groups of citizens, and are also being appropriated for new social activities. People have now a global reach to access, follow, interact, and create with people and resources. They can connect with each other ad hoc for a specific question or task and dissolve the connection afterwards. Many communities are supported by, or established in, online settings. They gather together people who have strong links to each other, are organised socially, and identify with the common purpose. Traditional

location-based communities are losing their significance for many individuals who have created their own mobile community through networks. Online spaces gather together people with weak and strong ties, facilitating collective and collaborative activities for all of them.

There has been a shift in recent years from individually-focused, instructional learning theories to those that are more socially situated and constructivist. As already pointed out by Salomon (1998), technologies can help to put into practice many of the desired educational principles, making large-scale changes possible and good practices available for more teachers and environments. The recent technological and social developments in online settings have the potential to support many of the recognised educational objectives in new ways, especially:

- Active knowledge construction,
- Social and situated learning,
- Learner-centred learning trajectories, and
- Informal and implicit learning.

Furthermore, in these new modes of social learning there is potential for new pedagogical concepts and aspects to emerge.

These new opportunities enable new lifelong learning of skills which are relevant for contemporary jobs, personal fulfilment, social cohesion and active citizenship. Carneiro (2007) discusses the changes needed to move into a learning society where 'learning throughout life' is supported. He suggests six major elements to change patterns of education and learning:

- Learner-centred rather than teacher-centred learning,
- Encouraging variety, not homogeneity: embracing multiple intelligences and diverse learning styles,
- Understanding a world of interdependency and change, rather than memorising facts and striving for right answers,
- Constantly exploring the theories-in-use of all involved in the education processes,
- Reintegrating education within webs of social relationships that link peers, friends, families, organisations, and communities,
- Overcoming knowledge fragmentation in favour of more holistic and integrated ways of knowing.

These objectives are becoming achievable in new ways through the deployment of social media and online networking. However, the informality of this online social world creates challenges for supporting and ensuring the personal development of all citizens, particularly those with fewer capabilities. Education and Training systems have an important role to play, but these systems need to take these informal social developments into account. The following chapters will discuss further how to reap the benefits of online informal networked and collaborative settings for European citizens and society.

3 Emergence of learning in the new settings

New technologies and applications are providing opportunities for people to easily create, publish, read, search, follow and manage media on the Internet, as an individual activity on various platforms and networks, and possibly in collaboration with others. These activities can provide important emotional and cognitive support for learning, as they not only compensate for face-to-face interaction and enhance access to information resources but also allow personalisation and ownership of learning.

This chapter synthesises the results of the review of the literature and resources, and the in-depth case studies, in order to draw a picture of the ways people learn in networked and collaborative informal online settings. It aims to discuss the activities and factors which influence learning and to identify situations where community membership might make a difference by enhancing learning results and experience. The first section summarises the way learning takes place in connection with different activities in online networked settings. The second section explores factors and enablers that promote participation and learning in these settings.

3.1 Learning opportunities in online networks and communities

The report 'Review of Learning in ICT-enabled Networks and Communities' (Ala-Mutka, 2009) pointed out three major types of drivers (a common interest in a topic, a common task or production, and social connection) for people to access and participate in online environments. These drivers lead to different types of activities. Some online platforms, networks or communities emphasise certain types of activity, but often they support many of them. For example, TuDiabetes (Aceto et al, forthcoming) gathers together people who want to share, find out about and discuss diabetes-related issues (common topic). They want to connect with others with the same diagnosis in order to share experiences and emotional support (social connection), and they want to develop resources for others in the same situation or with similar interests (joint production). Rather than discussing learning in specific types of networks or communities, it makes more sense to discuss it in terms of participation drivers and activities, as it is these that lead to changes in people's thinking and actions, i.e. learning. This section reviews the learning-related features in these types of participation.

3.1.1 Accessing and developing specific knowledge

Just as they would in offline life, people gather online around a common context, knowledge or interest for sharing, exchanging and learning from each other. These shared online spaces can be accessed when people need them, and they often have a core community of committed active members.

Access to a great diversity of situated knowledge. The user-friendliness of tools, which make it easy to set up new discussion groups on existing platforms or specific topic-based platforms, is creating a great diversity of resources. People can ask and look for information for a specific need, situation or task, from a large, possibly even a global, group of people, often getting a quick response. 75% of IT professionals who use IT online communities said that communities help them to do a better job and 68% stated that participating in an online community helped their professional development (King Research, 2007). Rubinelli et al. (2008) found that an important success factor for people learning to manage their

chronic health conditions was the targeted and quick answers they received in related online communities. The in-depth case studies of the research (Aceto et al., forthcoming) show several examples of topic-based communities. In these communities, people can engage with health-related issues (TuDiabetes), profession-related topics (Microbiology, TappedIn), lifestyle and personality (GayTV), learning (EnglishForums) and leisure (Bookcrossing). The case studies demonstrate many learning aspects of the participation experience, even if the participation is mostly accessing and reading materials. Also the literature shows that although the majority of network or community members are often 'lurkers', they still receive learning benefits from participation (e.g. Takahashi et al. (2003), Dennen (2008)).

Sharing and developing expert knowledge. In the case studies, the communication and discussion facilities were considered to be very important for the community, as they promoted and enabled the active engagement of members. Despite the lack of personal, face-to-face relationships and the ease with which people can 'free-ride' on the contributions of others in the online settings, open collaborative communication facilities are important for maintaining strong links among active community members, and also allow others to join in. Hew & Hara (2008) found that frequent knowledge sharers in a professional community feel obliged to contribute knowledge because: they have received help from others previously; they see their contribution as a down payment for future help; they want to benefit the profession by sharing necessary knowledge; they feel they can personally gain more knowledge in return. People also share their knowledge with others simply for altruistic reasons. In the Bookcrossing case study (Aceto et al., forthcoming), a 67-year old woman engaged actively in the community as she wanted to encourage others with her example, stating that 'you are never too old to read books'. This can lead to new knowledge and innovations being developed and shared by the community for the practices and topics related to the community purpose.

3.1.2 Development and growth through socialising

Many online environments provide an opportunity for people to come together and link with others on a joint platform. People can have weak links with occasional interactions with a huge number of people, and fewer stronger links and connections with those they want to. Socialising environments typically allow specific groups and communities to form around a joint topic or activity interest. Furthermore other types of environments commonly support the socialising aspect, as social affordances and experiencing a sense of social presence are important for the community.

Observing, reflecting and following life experiences. Social networking tools, on separate platforms or integrated into other community tools, typically facilitate personal profile pages, personal updates and links to other people's activities. These can lead to users being aware of the activities and lives of other people, creating a sense of connection even if no personal interaction is involved. Park et al. (2008) found that 62% of the adult participants in social networking environments believed that, even if learning had not been their initial intention, the profile-related activities led them to reflect on themselves, sustain social bonds, acquire specific knowledge, and cultivate a constructive life, which they considered to be learning-related outcomes. In the Experience project (one of the case studies, see Aceto et al, forthcoming) a community platform enabled individuals to look for others with the same interests and experiences and then connect with them to express, discuss, reflect and learn.

Building personal and professional identity through networking. Online social environments provide an opportunity for people to explore and develop different parts of their identities

with the social context and feedback provided by others. For people who have problems in expressing themselves in their own local context, this may be very important. The case study on the GayTV (Aceto et al., forthcoming) showed that virtual communication helped people to get over the experience of being isolated and to develop a more active and accepting attitude to life through being part of the online community. Virtual worlds and 3D environments afford opportunities for exploring identity and engaging in reflection and discussion about personal and moral values (Bers, 2001). Lenhart et al. (2008) found that when gaming, 52% of teenagers said that they had thought about moral issues. The professional community cases reviewed in Ala-Mutka (2009) provide evidence that participation can strengthen professional identity formation. These communities offer participants a safe place to develop and explore their career opportunities (e.g. Hew & Hara, 2008; Allan & Lewis, 2008). While novices can learn to become better practitioners, experienced practitioners can also gain new insights into their professional identities and the meaning of work (Gray 2004). Furthermore, connecting with other relevant practitioners and people creates connections and resources for searching for knowledge and advice in future situations.

3.1.3 Collective and collaborative production

There are many examples of online collaborations forming around an explicit task or production activity. Socialisation and discussion facilities play an important role here as well, aiding members to link up and negotiate the creation and building of a collaborative product or resource. Resources can result from the collective contributions of various individuals (social tagging, media sharing platforms) or be created by a collaborative community where the objectives, policies and organisation have been developed by the members.

Skills and knowledge on productive activity. Contributing to the digital media environment improves one's skills in learning to use, produce and express oneself with the required tools and practices. Case studies (Aceto et al., forthcoming) showed that some successful communities had specific advisory services for members, to help them learn to use the tools and become active members. Open source software (OSS) communities are a long-standing form of online collaboration, and research shows that they are seen as contributing to their members' production skills and as having economic significance, thanks to the products (Ala-Mutka, 2008). For example, Lakhani and Wolf (2005) found that the strongest driver for people to participate in OSS projects was that it was in their own interests, even though 40% of respondents were paid to do so by their employers. 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%). In a collaborative activity environment, it is in the interests of the community to help newcomers to become productive community members. For example, 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).

Collaboration and participation skills. Social online applications allow people to find groups and communities they can identify with. They then start participating and developing their role in the community based on the skills they have shown and respect they have earned in the community. This improves their own collaboration skills in the task and production-related context, and allows them to develop into more responsible roles. Bryant et al. (2005) studied nine "Wikipedians" showing how their roles changed from writing personal papers to becoming more concerned with the quality of Wikipedia content as a whole, taking on more "administrative" roles in the site. Cardon & Aguiton (2007) suggest that transformation of user goals, from individual interest to collective

concern, can be observed on other relational sites where people share user-generated content such as Flickr or YouTube. Social environments and tools also enable people to innovate and launch new ideas, and mobilise themselves and others for common goals. Several citizen initiatives have been implemented online, such as one set up to help the victims of Hurricane Katrina (Jones & Mitnick, 2006). In the blogosphere, 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).

3.1.4 Summary of learning through participation activities

Table 2 gathers together the basic types of activity and related learning aspects in online network and community settings. All of them are possible in either loose networks or a committed community. However, it is likely that active collaboration with other people takes place – or creates – a community environment with joint purpose, trust, organisation and practice among the active group.

3.2 Enablers and success factors

As explored above, learning can be either the objective or a side effect of activities in networked online settings. Therefore, important success factors for learning are the ones that enable people to come to these spaces and take part in the activities. Furthermore, as reviewed in Chapter 2, learning can be supported by self-regulated learning skills and interest, as well as by the social context. Communities with strong ties and common identification can provide more social experience for the participants than loose networks. This section summarises success factors for learning in these environments and settings, as identified from the literature and the in-depth case studies. It discusses the different phases of participation when considering the learning of individuals, with success factors both at individual level and at the community or network level.

3.2.1 Coming to the platform or community

Users need awareness, interest, and suitable opportunities for participation. In order to visit a platform or community, the user needs to be aware of it and be interested in what it can offer, i.e. perceive opportunities that are in his/her own

Table 2 : Typical activities for learning in ICT-enabled networks and communities

Activity	Learning perspective
Accessing individually and collaboratively-created resources	Learning situated knowledge and understanding through shared materials, pointers and discussion by peers on a current topic. Learn about common knowledge and practices on the field, obtain information that may be better targeted and more readily available for the reader's need than official information sources.
Sharing and developing knowledge with others	Learning to receive and give advice, listen to different perspectives, suggest, defend and accept opinions. Develop and discuss new ideas with others having similar interest or experience, develop collaboratively new innovations and practices.
Observing and following others	Learning about different ways of being, doing and thinking. Reflecting on one's own life, personality, knowledge and skills when comparing with others. Finding one's place in the society, context or profession.
Networking and socialising	Finding, building and maintaining connections with relevant people. Informal learning incidents through discussing with and listening to people.
Sharing personal contributions	Developing creativity on knowledge and expression. Risk taking, development and exploration of one's ideas and understanding by making them visible, redrafting and getting reactions from others.
Participating in collaborative production	Learning to work together, review and revise by giving and receiving comments. Developing new solutions and problems in a dynamic environment. Taking responsibilities, plan and allocate tasks, manage time and resources.

interests. The user must also have the necessary ICT tools, skills and confidence in using them in order to access the online environment. He/she needs to have time and supportive settings, e.g. in the work or study environment, which allow or even encourage relevant online activities. Furthermore, flexibility in the ways users can participate is important. The possibility to start participating through observing is an important route to active engagement, and the suitability of tools for community activities play an important role (e.g. Hew & Hara, 2008; O'Brien et al., 2007; Lai et al., 2006). The possibility for anonymous participation may also be considered important. In the Youth Net survey, anonymity was the single most important reason for why 62% of young people seek advice online rather than from other sources (Hulme, 2009).

There needs to be perceived value and quality. As mentioned before, users consider communities or online environments worth visiting and participating in if they perceive them to be valuable. Hara & Hew (2006) perceived credibility and quality, i.e. trust in the information and activities provided by the community, as important, and suggested that these 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 by and affiliated to established and respectable groups. Friends' recommendations also play an important role: in online socialising environments, the perceived value may be the opportunity to stay in contact better with friends. Having friends that use the same online networking or media sharing site is a major reason to participate in them (OCLC, 2007).

3.2.2 Getting socially engaged

People must be willing and have the skills to communicate and listen in the digital environment. The availability alone of the tools and environments for interaction is not enough to make interaction happen (Kreijns et al., 2003). There needs to be social and technical affordances as well as individual interest to make people choose to interact and network with others, although open online platforms allow them to remain observers. Furthermore, expressing themselves and understanding other opinions in the digital environment requires that they learn practices that are different from those of face-to-face communication. Establishing one's voice and identity in an online community is both critical and difficult, and autobiographies, for example, can contribute to it (Hodgson, 2008). When the online environment extends the relationships people already have elsewhere, with for example school friends, working colleagues, or bowling club friends, interaction can more easily be established, which helps people to get into the practice.

A sociable community culture encourages interaction. Initial online community experiences can play a critical role in participants' perception of the community and their active engagement in it. For example, Joyce and Kraut (2006) found that the bonding that comes from interaction between newcomers and members in the community influences the extent to which the newcomers continue to participate. Interestingly, in this study, it was the fact that newcomers received a response that mattered most, not the quality of that response. Geer and Barnes (2007) found that initial communication patterns are powerful in determining subsequent interactive behaviour in learning communities and discussion forums. Once established, they may be difficult to shift. The community should provide a sociable interaction environment that nurtures open and accepting attitudes with respect to different opinions. This can help members to express themselves more freely, explore ideas and create new innovations together. Trust and social relationships affect learner comfort, making it possible for them to express their criticisms and to engage in creative learning and group work (Geer & Barnes, 2007; Lai et al. 2006).

3.2.3 Becoming a contributing participant

Skills for production and openness to collaboration are required. In order to share creative expressions and participate in collaborative production, one needs to have the basic knowledge and skills for the activity. Although a platform may provide materials and support for learning these skills, typically some basic level is required, as other users are not prepared to use their participation time for complete beginners, for example, in an open source software development project. Furthermore, users need to be prepared to hear feedback, possibly critiques and improvement suggestions, give them themselves as well, and accept that different peoples' contributions will be mixed for a common purpose. This requires an open attitude to sharing and collaboration, which can be supported by trust and knowledge of the existing rules and regulations about the ownerships and uses of the products in the environment, e.g. with open licenses. These types of collaboration skills can be improved through continuing participation and productive collaboration.

Community organisation needs to support different levels of meaningful tasks. The community needs to have a culture and organisation (even if implicit) that allows people to have tasks that are interesting to them at different levels of expertise and community experience. Members should be encouraged to develop the roles and take the responsibilities which they are up to, including leadership roles that benefit the community. Both social and knowledge leadership roles are important and may be occupied by different people (Ryymin et al., 2008). Both experts and novices should have meaningful tasks, in sharing and developing their skills and productions. The literature suggests that expert members may consider sharing knowledge and helping others as a personally meaningful, rewarding and learning activity (e.g. Hew & Hara, 2008; Gray, 2006).

3.2.4 Learning from the activities

People must be interested in learning with and from others, and have the skills to do so. One's own motivation is a major enabler for learning as is one's ability to perceive it happening, which can provide satisfaction with the learning experience. However, in the informal and collaborative settings this is not always the case, as there are no clear measures to show learners, or people outside, the degree and results of learning taking place in the holistic activities. Benbunan-Fich & Arbaugh (2006) pointed out that learning perception and performance are not always consistent, as they measure 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% of participants defined learning as a reflective process. Users' different perceptions of learning showed different perspectives in their answers relating to whether social networking profile-related activities had led them to learn. Being aware of learning is important for developing it. Learners with good self-regulated learning skills are more motivated, apply better learning strategies, and respond to the environmental demands more appropriately (Wang & Lin, 2007).

The community should acknowledge and support learning. The community should embrace a culture where learning is acknowledged, valued, and supported. At the community level, this means encouraging diverse membership and encouraging community members to develop new ideas and empowering them to affect developments in the community. In many studies, the role of the online moderator is identified as critical in sustaining an online community over an extended period or enhancing the learning function (e.g. Redecker, 2009; Dennen, 2008). For the members, learning should be encouraged, supported and valued. Technologies are an important enabler but also a major barrier, as all activities are carried out through them,

requiring not only new media but also new practices for communication and collaboration., Starting to work with new tools, new forms of communication, new people and new practices may place a high cognitive burden on someone who is a newcomer to the internet. The case studies (Aceto et al., forthcoming) showed that communities can support newcomers' learning with helpdesk services, and this may become a success factors for the community.

3.2.5 Summary of success factors

An overall success factor for all aspects and levels of participation is the opportunity and skills to use the mediating tools. Haythornthwaite (2008) maintains that a community's technology solutions play an important role in allowing users to develop latent ties that may later, after they have followed the community from a distance, turn into weak ties. One reason for the emergence of these new internet-based networks and communities is the availability of technologies that are easy to use and can be integrated into other daily activities. ICT enables various ways of participating, for example interaction can take place through discussion boards, the commenting facility on posted videos, real-time chat, broadcasted questions, etc. Users can reach and contribute to online resources and contact other people through various tools, such as web browsers, mobile phones, from work or home, whichever suit their personal needs best and are supported by the technologies deployed by the community. Suitable and user-friendly technologies are important, and do not necessarily need to be filled with features. For example, Hew & Hara (2008) found that participation in an online e-mailing list community offered continuous professional development to nurses.

The main difference between networked individuals and strongly tied community members is in their commitment and identification with the collective group of people with a shared purpose. Where learning is concerned, this sense of belonging and commitment can provide important emotional support, understanding and patience between people, which motivates and enables setting longer term objectives and working towards them with others. Table 3 gathers together the success factors for participation activities and individual learning in online collaboration. These factors include requirements for the learner as well as ways for the community to support activities and individual learning in connection with them.

Table 3: Success factors and enablers for learning in online networking and collaboration

Participation aspects	Success factor of the community	Success factors of the learner
Accessing, coming to the platform/community	Providing value and good quality; Having a clear purpose and rules; Providing and allowing flexible modes of participation	Awareness of the platform/community; interest in the topic/activities/resources; Skills and resources (time, access) to participate
Social activities	Sociable and emotionally positive environment; Encouraging interaction environment and culture	Communication skills to listen, accept and defend opinions, express, advice, consider, reflect and discuss with openness to new ideas.
Contributing and sharing	Encouraging different roles and responsibilities; Tasks for different skills levels and interests	Skills to express creativity, produce, negotiate, listen and give comments, as well as get engaged with, manage and take responsibility of tasks
Learning by the individual through the networked activities	Culture that makes learning visible in community activities; Support learning (technical, topic, community culture) of members with services and resources; Support collective knowledge building; Enable and encourage diverse membership	Perception of learning and its relevance for oneself; motivation and interest to learn while participating; skills to evaluate one's needs, achievements and progress in learning (self-regulated learning skills); commitment to the community

Encouraging and empowering individuals to participate in collective knowledge building is an important part of learning at the community level, and can foster new knowledge and understanding for the members of the community. As regards individuals, the most important factors that enable them to learn by participating are related to their openness, intention and learning skills. These skills can be improved through participation and in interaction with other individuals and members of the community.

3.3 Discussion

This chapter has given an overview of the ways learning emerges in online collaborative settings. These online spaces can provide individual activities within the networked environment and promote engagement in communities where the members interact and identify with each other and have a shared purpose, policies and tools. The basic participation motivations relate to a topic, a task or production, or social connection. The related participation activities contribute to learning, often as a side effect.

Different online platforms, networks and communities offer opportunities to learn various types of skills, relating to all the key competences for lifelong learning (Ala-Mutka, 2009). Resources are available for a range of topics, and people have a chance to learn knowledge through experience, and within the social and application context. This helps them to learn knowledge, skills and competences (attitudes) holistically, developing them with other learners, practitioners and stakeholders. Learning is not limited to certain previously codified knowledge but develops and can be negotiated with others, therefore becoming both social and individual learning. Furthermore, through the process of learning and participating, the learner builds connections and practices for further learning and tasks. Figure 1 gathers together different types of activities that contribute to learning as learning outcomes in these environments, discussed in this chapter.

Figure 2 gathers together success factors for different participation elements and learning through them. It describes both the individual and community dimensions. These success factors relate to both the individual's skills needs

Figure 1: Activities contributing to learning-related outcomes in networked online settings

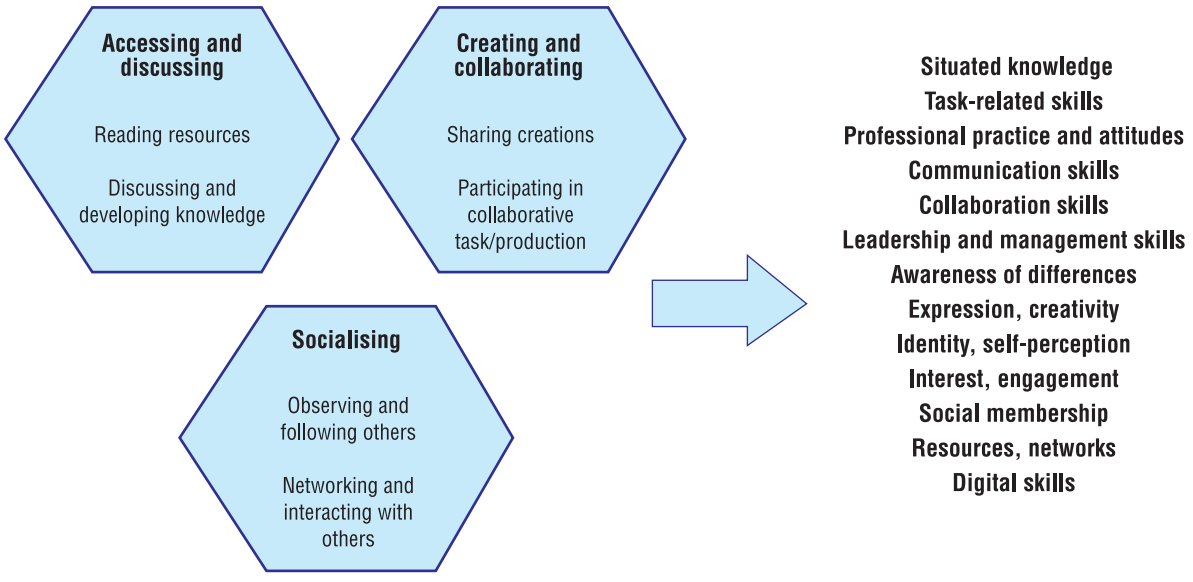
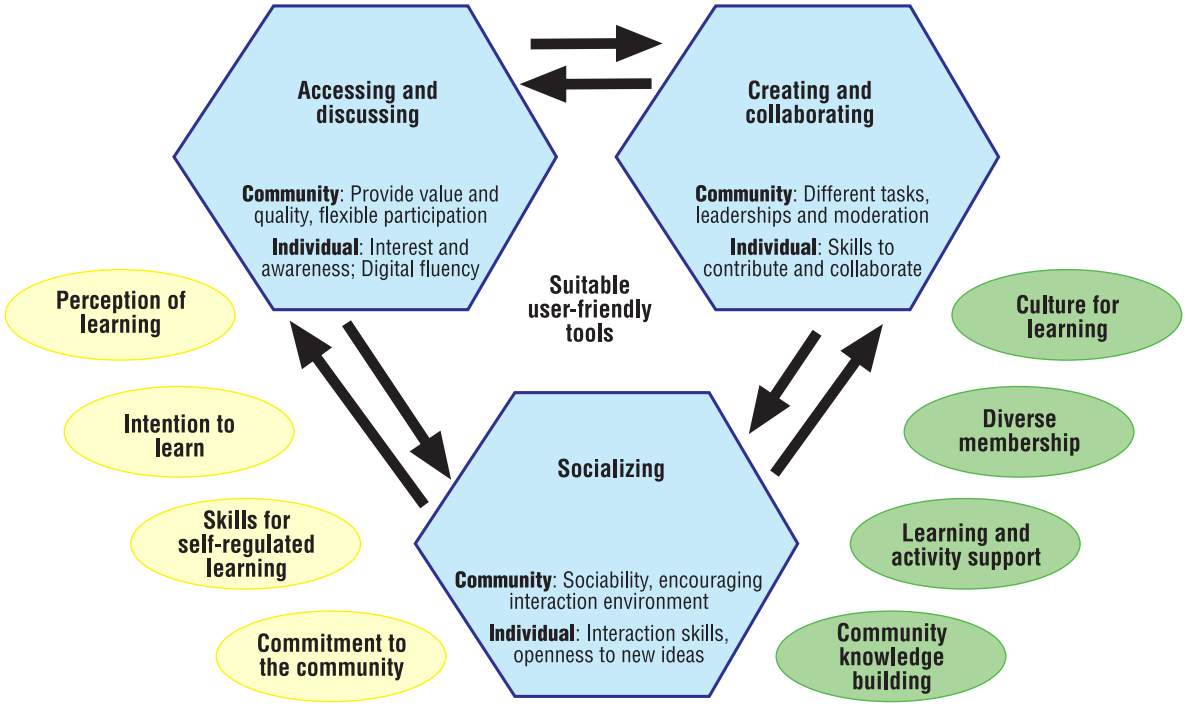


Figure 2: Success factors for participation and learning in networked online settings



and aspects of the platform or the community. Success factors for learning by the individual, either as a community member or in any networked activities, emphasise the skills and attitudes of the individual. This is a circle, as some skills and perceptions are needed in order to start participating, but through these activities these can be developed further. Individuals can improve their skills in the activities on any platforms, but participating in a community with actively engaged members may increase the amount of active social interaction and feedback as well as their own commitment to learning.

Learning in online networks and communities can be an individual activity in a social environment, or conscious social participation and meaning making in the community. It is worth noting, that participation and learning activities in online networks and communities support all four of Unesco's education pillars, which are defined in (Delors, 1996) as:

- ***Learning to know***, by combining a sufficiently broad general knowledge with the opportunity to work in depth on a small number of subjects. This also means learning to learn, so as to benefit from the opportunities education provides throughout life.
- ***Learning to do***, in order to acquire not only an occupational skill but also, more broadly, the competence to deal with many situations and work in teams. It also means learning to do in the context of young peoples' various social and work experiences which may be informal, as a result of the local or national context, or formal, involving courses, alternating study and work.
- ***Learning to live together,*** by developing an understanding of other people and an appreciation of interdependence – carrying out joint projects and learning to manage conflicts – in a spirit of respect for the values of pluralism, mutual understanding and peace.
- ***Learning to be***, so as better to develop one's personality and be able to act with ever greater autonomy, judgement and

personal responsibility. In that connection, education must not disregard any aspect of a person's potential: memory, reasoning, aesthetic sense, physical capacities and communication skills.

Delors (1996) pointed out that formal education systems tend to emphasise the acquisition of knowledge to the detriment of other types of learning. Carneiro and Draxler (2008) argued that, actually, "learning to live together" is both the most evocative and the most elusive of the roles of education in the 21st Century. Online networking contexts and activities provide an efficient means of learning about diversity and building important social capital, in a global knowledge economy. Tool-building for learning throughout life happens at schools, and the way they interact with the community and connect learning to life experiences is important in preparing people for their roles as citizens, and as social and economic actors (Carneiro & Draxler, 2008). Therefore, it is important that schools and educational environments take into account the reality of online networking and collaboration, and provide skills for learners to take part.

An important source of learning in these environments is peer-to-peer interaction and collaboration, which often provide unexpected learning conversations and incidents. In communities with a joint purpose, there is active interaction and a shared context that allows these incidents to take place more often and people to consider them more than they do when they participate in loose networking activities. Participating in networks and platforms without specific community commitment is mainly based on personal decisions about carrying out activities, exploration and learning paths. People have the freedom to express their innovations and ideas without restrictions, and by following a large number of other contributions in different networks, they can develop new ideas. The downside of this approach is that users who do not have the skills and confidence to express themselves, approach others, use the tools effectively, or imagine possible activities, may not get engaged with or even recognise the learning opportunities available. Furthermore, if there is no common culture or there are no connections between people, there may not be much peer feedback on online contributions, allowing misconceptions on both the part of the contributors and the readers to arise.

The chapter has recognised some of the skills and enablers that are needed to support participation in networked and informal online activities and, through them, learning. Digital fluency is a prerequisite for acting confidently in these environments and learning through participation. People should be educated and trained for all these skills, and communities should also consider them, in order to support learning by their members and, through this, the development of the community. The following chapters will discuss options for different stakeholders to empower people for these opportunities for lifelong learning.

4 Opportunities and challenges for Education and Training

As seen in the previous chapter, informal networked settings enable learning through various activities such as finding and observing, and interacting and contributing online. People participate in these activities since they are in their own interests. The activities contribute to learning by individuals and also the development of the knowledge and practices of collectives. Networks and communities also provide opportunities for developing and innovating learning at educational institutions. However, many of the positive aspects recognised also have related downsides and challenges. This chapter summarises the opportunities and challenges that these learning environments offer for the achievement of major Education and Training policy objectives: equity, quality and efficiency of learning, new skills and competences, innovation for institutions, and the lifelong learning continuum.

4.1 Enablers and barriers for equity

Learning in informal online environments is essentially based on the intrinsic motivation of the learner to take part in activities that are possible and he/she selects to pursue. People who may not be interested in 'going back to school' can find new opportunities and connections that help them learn in informal online settings. However, inclusion in these learning opportunities may become problematic. Not all important knowledge and skills can be learned through these means. Furthermore, not everybody has the opportunity, knowledge, or initial motivation, to go and have a look at whether these activities and learning would provide something valuable for them.

People get engaged because they are motivated by the activities. The main aspect of learning in informal settings is the intrinsic motivation and pleasure pursued and experienced. Hague and Logan (2009) found that 94% of adults had engaged in informal learning activity in their leisure time in the last three months, and 48% of them did it because they said they enjoyed learning. In informal settings, learning follows as a side effect, or as a result of fulfilling one's intrinsic motivation to know, to accomplish or to experience. This is an important aspect, as it is suggested that well-developed personal interest can also help individuals overcome low ability and/or perceptual disabilities (Hidi, 2006). Since examples show that engaging activities enable learning, education should find ways to include more of these activities in their approaches, such as: joint tasks that are productive and interesting, searching for information and learning through inquiry, setting one's own goals and working towards them, sharing one's own creative productions and receiving feedback on them, interaction with experts and peers on one's topics of interest, following the activities and productions of others, feeling commitment and getting engaged in a group with a common purpose.

There are new and open ways to reach learning opportunities. Online platforms and communities often allow newcomers to join as long as they follow the rules and culture of the environment. Diverse topic-based platforms, professional communities, general information resources, media sharing platforms and citizen journalism provide a vast range of information resources, available at any time of the day. These also provide places where one can find experts to ask advice or discuss any specific topic. This leads to opportunities where people can learn more easily and find help on demand. Furthermore, through exploring and interaction, they can find topics and learning opportunities which they become interested in, even though were not aware of them before. Educational institutions are already experimenting with

the new channels and environments emerging through social computing, e.g. by establishing presences in virtual worlds and social networking sites, or by making lectures available through YouTube (Redecker, 2009). Additionally, the open educational resources (OER) movement provides resources and developer communities that enhance learning opportunities for citizens and educational experts.

Scope of learning through these means may be limited. Although examples show that many types of learning result from informal activities in social environments, not necessarily all important skills and competences can be covered through them. There are, for example, abstract and scientific concepts that can be learned with the help of an expert and develop personal thinking (Vygotsky, 1986), but which do not necessarily come up in self-directed activities with peers. Furthermore, becoming an expert and learning complex skills often requires hard work and either strong guidance or self-discipline to work towards long-term goals, possibly without receiving short-term reward or enjoyment. Another concern is that some basic skills are prerequisites that must be mastered (e.g. numeracy and literacy) before they can be used effectively for other learning. These need to be obtained elsewhere, before coming to these environments, as even committed expert communities are not prepared to provide extensive support for complete beginners.

Not all potential learners have interest or awareness of lifelong learning. Many members of the current generation of adults have not practiced or learned to pursue and value self-directed lifelong learning, especially those with less education. In the age group 25-64 in 2007, only 18% of people with low education, as opposed to 59% with tertiary qualifications, participated in education and training activities (Eurostat data). Hague and Logan (2009) found that 79% of adults said they use technology for learning in their leisure time, on average 8.5 hours a week, but this was less in lower social classes and more in the highest classes. Boulton-Lewis et al. (2006) found that among older adults, high income was significant in wanting to learn. There is a risk that adults are not aware of the benefits of learning in informal contexts and online networked settings. It is important that learners are prepared for lifelong learning right from the beginning of their education, and are also helped in various ways to realise these opportunities and get recognition for their learning achievements during their adult lives as workers and job seekers.

Ensuring ICT access and digital fluency for all is becoming essential. Divides between the digital natives and non-natives, and different social situations may hinder take up and therefore the learning benefits from reaching new groups. The percentage of people who had never used a computer was 26% and those who had never used internet, 30%, in the EU27 in 2009 (Eurostat data). The unemployed, people with low education and the elderly have higher shares of non-usage than the European average. Hague and Logan (2009) found that 96% of the adults using technologies for learning in their leisure time, do so at home. Therefore, households without computers and internet access are disadvantaged. Although access-based divides have been closing in recent years, skills-based divides are another great concern and these are aggravated by social computing approaches. Skills to confidently and critically use digital tools for expression, communication and collaboration for the purposes of work, leisure and learning, are crucial in the European Information Society.[16] In order to benefit from the potential of learning in ICT-facilitated communities, both basic tool usage and advanced digital skills are critical. However, advanced skills do not follow on automatically from basic tool usage (Ala-Mutka et al., 2008).

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

4.2 Effectiveness and efficiency for learning

Connections with other people, communities, and their contributions and products are the essence of activities in informal online networking settings. Online contributions are related to people's personal interests, real-life situations, and community objectives. Therefore, learning is typically connected to its application, and to building personal meaning, within a social context. However, the randomness and diversity of learning in these settings makes it difficult to use for specific predefined learning objectives or to estimate current progress towards them. Learners' self-regulated learning skills are crucial, and providing systematic advice and guidance can also help them to progress towards desired and useful learning.

Learning takes place in a social and often multicultural context. In online settings, the platform and community sets the context based on a topic or task or functionalities available, and participants are there to contribute, learn or carry out related activities. These environments encourage collaboration, asking and sharing advice with others and provide plenty of peers with whom it is possible to connect through shared issues. Diversity of participants from different settings and cultures can provide a multitude of viewpoints, opening the individual's perceptual horizon in new ways. Furthermore, unlike classroom situations, online communities gather both novices and experts in large numbers in the same context. Learning is supported through interaction between people in the two groups and when novices can follow the activities of experts. Helping novices to learn can be a 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 communities of practice, not only the novices but also the experts learn from the interaction.

Learning with practitioners leads to situated up-to-date knowledge and skills. Interactions in online communities and networks are related to concrete problems in the task or topic at hand, the participants' lives, current issues in the society, or whatever other issues the platform or community is supporting and its participants are interested in. Therefore, knowledge is situated in the context, phrased in the form of narratives or given as targeted advice from peers or experts in answer to a specific question. These environments can support learning and work-related tasks effectively with the collaboratively constructed joint and current practice, and provide knowledge with more meaning for the learner than studying theoretical information without understanding of its application. For example, in a 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 (King Research, 2007).

Learning processes are active and engaging. Personal motivation combined with active engagement and interaction with tools and people in online settings can provide rich and influential learning experiences, which also relate to offline issues, through reflection and discussion. ICT applications can also provide immersive experiences to individuals and groups, expanding the scope of activities and social experiences. These types of activities can enable learners to actively construct their knowledge and understanding with personal and social processes, and have personal ownership of the activities, products and resulting knowledge, motivating them to learn more. Institutions could learn from these examples and aim to improve and develop their approaches by enabling and encouraging similar activities relating to the topics studied at school and on courses. Furthermore, they should develop environments which allow non-task related interaction to support and build social affordances (Kreijns et al., 2003), which enhance students' engagement and sense of community.

Both guidance and self-regulated learning skills are important to ensure quality of learning. The variety of opportunities and activities with potential for learning does not guarantee learning for all Internet users. It is easy to jump into doing things and writing comments without thinking or reflecting, therefore without developing one's understanding. Free exploration can become a process of trial and error for finding solutions that seem to work, without stopping to evaluate the progress or results. Research suggests that learning approaches with minimal guidance are always less efficient than structured and guided ones, and with low-skilled learners, they can even lead into mis-learning (Kirschner et al., 2006). Teachers are still needed, but their role changes for learning facilitators and guides, encouraging and allowing students to learn in diverse ways. In informal online settings, it may be difficult to identify dropouts and people with difficulties. Furthermore, plenty of resources are published without official quality checks, emphasising the need for critical skills for evaluating the reliability of materials and their sources. In communities with joint purpose, peers can guide and point out needs for one's development. However, it is not guaranteed that everyone will get this kind of support, even though they might need it. It is crucial to enhance all people's skills for self-regulated learning and critical media literacy, in order to empower them to pursue learning towards relevant and useful results.

4.3 Achieving new skills and competences

The review of literature and resources (Ala-Mutka, 2009) showed that online networks and communities provide opportunities for learning all the key competences for lifelong learning (European parliament and the Council, 2006): both topic-specific competences (mother tongue, foreign language, mathematical and scientific competence, digital competence) and transversal competences (social and civic skills, cultural awareness and expression, creativity, innovation and entrepreneurship, and learning-to-learn skills). Furthermore, these spaces support identity development for both personal growth and professional development in new ways. They also enrich people's lives with connections and opportunities to see diversity. Additionally, collaboration and production with others around joint interests develops collective knowledge and practice. These are very important when considering the policy emphasis on developing new skills for new jobs, which require that people have transversal competences and the ability to adjust themselves and learn more in dynamic environments. However, in informal online settings, many transversal skills are developed without uniform structure and progress, which makes it difficult to identify learning results, and their value for jobs and other contexts.

These environments provide the opportunity to learn and practice transversal skills. Online collaboration encourages the development of transversal competences, often not part of the traditional curricula. The freedom to carry out activities and interact and the new digital tools make new expressions possible and support personal creativity and innovation in new ways. Collaboration with people from various contexts enables individuals to learn to work together, listen to others, consider different viewpoints, engage in and mobilise activities, take responsibility, and accept cultural differences. Surveys show that 61% of blog writers want, to a greater or lesser extent, to motivate people to take action (Lenhart & Fox, 2006). On average, two in ten people have been spurred into action as a result of reading a blog (Edelman, 2007). In online networks and communities, these skills are obtained and improved through practice and experimentation. For example, Lee & Hoadley (2007) found that after engaging in massively multiplayer online games, middle school 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.

Technologies and social contexts provide new means to develop identity. The great variety and number of online communities on different topics and tasks, which gather people from different settings and professions, provide a multitude of contexts to explore and develop one's own identity at one's own pace. Social networks can be extremely important for helping young learners to make their educational choices and career decisions (De Freitas et al., 2006). These are easily maintained and accessed online, and visiting different communities can help learners to understand which practices and ideas they can identify with and which not. Professional communities can help novices to become better practitioners, and experienced practitioners can also get new insights to their professional identities and the meaning of work (Gray 2004). Building personal profiles and following other people's profiles in social networks allows people to explore socially, reflect on themselves, sustain social bonding and cultivate constructive lives (Park et al, 2008). Lenhart et al. (2008) also found that the youngsters developed their social and civic awareness through social gaming.

Learning outcomes include resources, connections, and strategies for future tasks. Communities and networks are not only the means for learning, but also important outcomes in themselves. Established connections and memberships provide resources that people can effectively deploy later when necessary, and access even when their places of residence, work or study have changed. Furthermore, building connections to relevant resources by following their development (for example with RSS feeds), provides a way to keep constantly updated of the developments in relevant communities, and most important practitioners. Ryymin et al. (2008) found that in a teacher social network, the members quickly developed a sense of 'who-knows-what', and this kind of knowledge can be effectively used when needed. Even when tasks and topics of interest change, the experience obtained in searching for relevant online environments and resources, communicating with the tools available, interacting and collaborating with other members and practitioners, helps to deploy similar, or better, strategies for the next time.

It is difficult to recognise, value and support the new skills. Future skills needs emphasise holistic and transversal skills and adaptability to change in jobs and society. Online communities provide many of these important skills, but it is not clear how to recognise and encourage them. Becoming a group leader and managing tasks in an online community also increases leader competences in other environments. Becoming a respected member in an online community of practice signifies having competences in the practice. However, activities in informal online environments are not necessarily valued as much as activities at the workplace or an educational institution, and they are not directly comparable either. More research is needed to study the value and potential of competences obtained in online collaborative activities for different types of jobs and offline social situations. This is important in order to help employers, organisations and the online actors themselves to see which activities are worth mentioning as specific competences and skills at work and in job seeking. When the value of skills and competences in online collaborative environments is better recognised, people may also become more motivated to pursue and support learning them.

4.4 Innovations for educational institutions

Online communities could enhance the desired modernisation and innovative transformation in educational institutions in several ways. First, participation in online communities has the potential to enrich students' learning outcomes and their preparedness for lifelong learning. Second, partnering and collaborating with communities of practice could develop learning content and methods that better respond to the needs of workers and society. Third, networking and collaboration approaches

between educational actors could provide better motivated and skilled actors, equipped with a much wider variety of resources and innovations than could be provided by an individual or within one institution. However, there is major inertia in educational institutions, and, as yet, there is not enough evidence and best practice in finding and spreading good innovations.

Education approaches can benefit from resources outside the institutions. The emergence of different online platforms, networks and communities provides an opportunity for institutions to benefit from outside resources for students' learning. Promoting skills to safely and critically participate in relevant productive communities could improve the relevance and quality of learning outcomes for the labour market. At the same time, it would prepare students for lifelong learning after the formal education. Another asset, as yet unused, is the great diversity of technologies that young people have at home and in their pockets, which they use actively for leisure and networking purposes, and also informally to support their schoolwork. Institutions could benefit from these resources by allowing and encouraging students to use their everyday tools for homework. This would relieve institutions from some equipment investments and better integrate school tasks and learning into students' everyday lives. Institutional equipment and guidance could support those who would not otherwise have access to technologies.

Educational institutions can connect with employees, employers and citizens in new ways. Establishing presence and opening up materials (open educational resources, OER) in online networking spaces can provide new channels and visibility for the educational institutions, connecting them with both current and prospective students. Furthermore, access to institutional materials for other developers and networks can improve the quality of content creation processes and products (Geser, 2007). Participating actively in relevant professional associations or informal organisations relating to education topics could link educational actors, especially in higher and vocational education, to current developments in the field. This would help them to keep their topic-specific knowledge up-to-date and to understand the current debates and skills needs that would be relevant for their students. Partnerships with stakeholders for developing professional curricula could be used to develop the content of the degrees to better meet the needs of the job market.

Networking and communities can be used as a means to develop educational practices. Experience thus far shows that despite the increasing use of ICT for education, educational practices in institutions have not changed (e.g. Punie et al., 2006b). This means that pedagogical innovations lag behind technological developments and everyday practices, and the transformative potential of ICT has not had the same effect on education as it has on other sectors (European Commission, 2008c). Pedagogical innovations lag behind technological developments and changes in practice. Finding ways to improve the pace of adoption of useful innovations will be a major challenge. Networking and communities, which also admit contributions from other stakeholders, could be a new means of developing innovation and getting educational actors integrated into mainstream practices. For example, OLnet[17] aims to create a community of researchers, practitioners, and learners to develop reusable and high-quality learning materials and practices. Within organisations, enabling a community approach to connect learners, teachers, administrators and ICT personnel could contribute to experimenting and developing new practices that respond to the actual needs for change, and would have high adoption among different actors.

More research and knowledge about how to transform institutions is needed. Achieving changes in educational institutions, whether

17 http://olnet.org/

these are schools, or vocational or higher education institutions, requires several levels of decision makers, teachers, learners and third parties to share motivation and implement the change. Carneiro (2009) points out four key levers of institutional change in universities: structure, culture, leadership and governance. In all educational institutions, there are many practical and regulatory barriers to change, such as over-prescriptive curricula and assessment requirements, old-fashioned systems for teacher workload allocation and measurement, and resistance to change in existing power structures and already-established practices. Lack of awareness and understanding of the benefits of new approaches, economic uncertainty and doubts about the sustainability of the value of the investments constitute major barriers to practice transformation. More research and analysis is needed to find and disseminate evidence of the value of the new approaches and incentives for different levels of stakeholders, as well as examples of new practices in learning, teaching, and management.

4.5 An environment for lifelong learning continuum

Many citizens, workers, students and children are already using the internet and accessing different platforms, networks and communities for various purposes and activities. These environments allow people personalised lifelong access, resource building for information and emotional support, and participation, whether they are in formal education, at work or pursuing any other activities. This provides a new way to combine formal and informal activities, in a user (or learner) centred way. However, it also creates challenges in the management of boundaries and ethics relating to crossing them for different purposes.

Learners can create individualised lifelong resource environments and trajectories. The great number of opportunities to network with others on joint platforms, topics and tasks provides new ways to build personal lifelong learning trajectories taking into account what the learner feels capable of and interested in pursuing and learning. Personal competences can be built through belonging to and visiting various communities, synthesising and building one's identity through various social contexts in parallel. The possibility to have different roles in taking part in network and community activities accommodates different learning styles (Kolb, 1984), supporting learners to find learning opportunities that match their interests and preferences. When applications are hosted on open platforms, people can build their customised interfaces that gather the access and update links to the other resources they have an interest to follow. Baggetun & Wasson (2006) discovered that university students are already doing this, building their personal resources and networks with their blogs. Skills, advice and suitable tools should be provided so that all people could do the same, to build their personal digital spaces that support connections and learning, whenever and wherever necessary.

There are risks to formalising and changing informal activities. Encouraging people and educational institutions to use informal networks for formal learning tasks may change the way they are used. The same may apply to embedding tools such as discussion boards or wikis, that work well in informal tasks, into given coursework. Participation motives and objectives in informal activities are different from those of formal settings. In formally set tasks, students apply the 'educational culture' they are used to, and are affected by what is assessed or rewarded (Cole, 2009). Hemmi et al. (2009) suggest that the appropriation and control of social computing tools as academic activity spaces limits their value for learning. Self-regulated learning research suggests that, under stress, learners may simply aim to cope, rather than learn or master (Boekaerts and Niemivirta, 2000). Furthermore, students may not see it positively if teachers enter the social spaces they consider to be their leisure

time activities. They may feel pressured to express themselves more carefully, or hide some of their interactions from teachers.

Learning in these environments is difficult to identify and validate. As discussed throughout the report, learning in informal online networks and communities can take various forms, according to the interests and skills of the individuals. This makes it difficult for people to identify what and how much they have learned, if they want to make it visible and transferable to other environments, for example when they go to a new community or apply for a job. Cedefop (2008) suggests a model for validation systems for learning outcomes of informal and non-formal learning, following the European Qualifications Framework (European Parliament and the Council, 2008). The process starts with the learner identifying the knowledge, skills or competences they have achieved, and then finding ways to provide evidence of it. However, as even the learners themselves in these environments do not always realise what they have learned, people, tools and institutions could provide important help in recognising valuable learning, which would allow learners to decide if they want to intentionally pursue it.

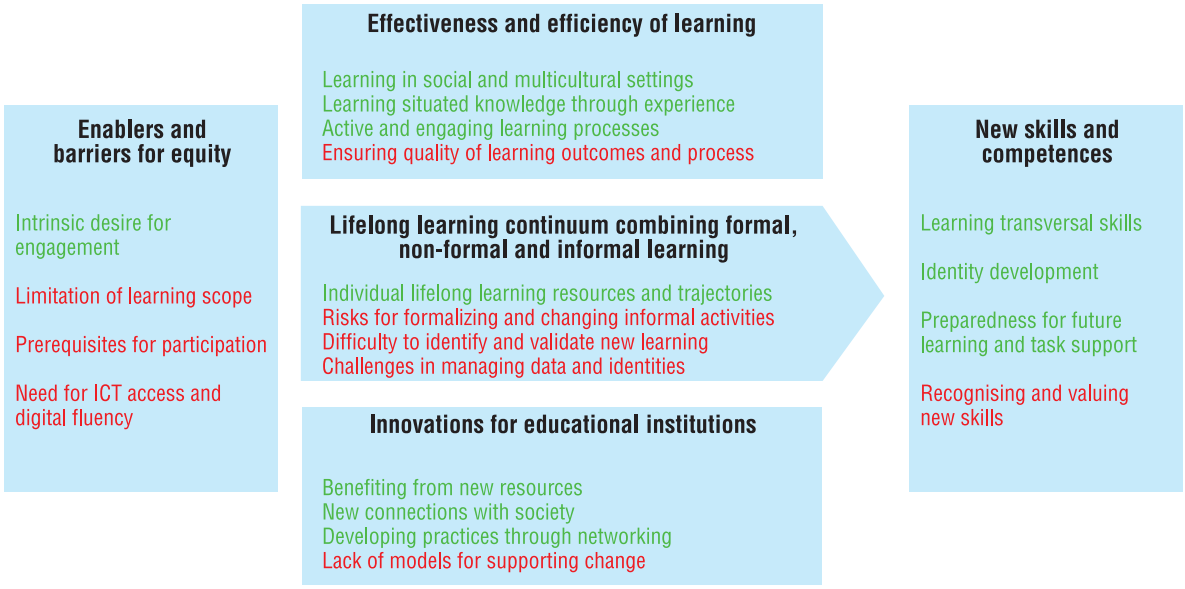
People need to be able to manage their digital identities and data. There are many unresolved challenges and open questions relating to the ethics and tensions between informal and formal life and to integrating them with online tools over a lifetime. People may express changing views and opinions over years of learning and exploration - online environments, however, can continue to display old expressions, even though the person responsible has developed and moved on. Currently, users do not necessarily have the opportunity to remove data and content that they have published on a platform, and thus old learning trails may be visible for a long time afterwards. Another issue is that as internet applications are converging and their usage is increasing in all settings, people may have problems in separating work-related, study-related and private networking. They do not want to share their private holiday pictures with work colleagues, but if both personal friends and colleagues use the same social networking platform, how can they avoid it? Solutions need to be considered and developed for users to manage their private and other identities, so that they can really develop different relevant resource networks and use them flexibly throughout their lives.

4.6 Discussion

This chapter has discussed the opportunities and challenges, identified during the study, that could arise with the use of online networks and communities for Education and Training in Europe. Figure 3 gathers together the aspects discussed in this chapter. Existing research literature, expert consultations and the in-depth case studies show that online networks and communities can contribute to all the major Education and Training policy objectives, i.e. modernising educational institutions to support lifelong learning continuum with new opportunities for equity, quality and efficiency, as well as learning key competences and transversal skills. However, harnessing this potential is far from easy, as there are several barriers and challenges relating to stakeholders' skills and attitudes, tensions in blending informal and formalised objectives and activities, and the availability of resources to prepare and develop take up of the new opportunities.

The opportunity to get engaged in various activities and to observe how other people are doing them, can help both in finding targeted knowledge when needed and in learning through practice in a social environment. However, typically the learning in online networking and collaboration does not follow pre-defined paths but very individual activity and learning trajectories. Therefore, it is difficult for learners to show what they have learned and what their state of progress is, should they wish to demonstrate to the outside world the skills they have obtained within the current community. Furthermore,

Figure 3: Opportunities and challenges of informal online collaborations for Education and Training



without systematic guidance for learning, there is a risk of misunderstandings and ineffective routes of inquiry, which may even lead to mis-learning. As people are using these environments actively and increasingly in any case, ensuring digital fluency for all is crucial and developing self-regulated learning skills an essential enabler for lifelong learning.

Overall, informal online collaboration and networking provide new tools to complement organised education in creating future learning spaces that enable meaningful and learner-centred lifelong learning in the knowledge society. However, this requires an important change in thinking about lifelong learning. It must be seen from the learner's perspective, and as taking place all the time in various situations, instead of from the learning providers' perspective, which emphasises planned educational situations and activities. Many of the current systems and attitudes are not compatible with the open and learner-centred perspective among the learners, education providers or employers. There are three major needs for change: 1) to empower and enable learners for lifelong learning with all available opportunities, 2) to improve the efficiency and relevance of education provision and learning support, taking into account the digital and social reality in which learners and citizens live, 3) to shift from certifying education to validating learning outcomes, in a way that helps to identify, pursue and demonstrate competences and skills for different purposes.

The following chapter summarises the implications for different stakeholders and suggests ways in which they can meet the challenges and reap the benefits of the opportunities provided.

5 Implications for Education and Training stakeholders

This report has brought up several opportunities and challenges that learning in online networks and communities provides for the lifelong learning policy objectives, with an emphasis on equity, efficiency and effectiveness of learning and learning new skills for new jobs. People should learn to be innovative, adaptable to different circumstances and changing tasks and collaborate with others in addressing the challenges in their life, work and society.

An important starting point is to realise that online networks and communities should not be just another tool to be used for implementing the same educational practices as before. They have the potential to help in the overall task of changing the educational culture from an industrial paradigm to empowering individuals for learning throughout life in a 21st Century Learning Society (Carneiro, 2007; Carneiro & Draxler, 2008). Furthermore, they provide means to support the new EU strategy for youth policy, which aims to improve participation of young people and foster solidarity between youth and society.[18] Changes in attitudes, activities and approaches should take place among all stakeholders, so that they create and establish new educational cultures in collaboration. However, there are enabling dependencies between the stakeholder groups: for example, students cannot carry out activities that have not been made possible by their teachers, teachers cannot implement approaches that are not supported by the institutional environment, schools cannot change requirements that are set in national curricula, and so on. This chapter aims to give brief suggestions for the several overlapping stakeholder groups in lifelong learning.

5.1 Learners

All people are lifelong learners, and can be served by networked learning opportunities through internet. The following specific suggestions can be targeted at those in initial formal education (students), and those already past it (workers and all citizens). Teachers are also among the workers that need lifelong learning. These suggestions are important for everyone, and may require specific awareness raising, encouragement and support, before they are taken up by people, for whom these would mean a change of culture they were raised to or had heard about from their colleagues.

5.1.1 Students in initial formal education

Learn for life and work. Students should aim to make meaning, rather than be the first in class or have the best grade in the exam. Learners should be enabled and encouraged to learn at school issues and topics that they can connect with the real life context. This requires certain types of didactics by the teacher and also a change in the concept of school as promoted in the industrial society or shown in the forms of tasks given to learners. Learners should be allowed and encouraged to ask why they are required to learn something and teachers should be prepared to answer – or develop the answers with the learners. This would also make it possible to embed the ICT dimension of the lives of the digital generation in learning and teaching practices, and encourage learners to share their knowledge with each other. Furthermore, non-formal and informal learning opportunities through online networks should be developed to re-engage early school leavers with learning and education.

18 See the EU strategy "Youth – Investing and Empowering", http://ec.europa.eu/youth/news/news1458_en.htm

Build skills and resources for lifelong learning. Learners should understand that learning once is not enough. Instead it should be an ongoing process in changing settings, and schools and courses should be places to learn for continuing learning in other places. For this purpose, learners should learn to know and participate in relevant (online) environments outside school and use them as resources for learning. They should know how to use these resources ethically and responsibly during their leisure time and continue using after the school is over. They should learn to look for, evaluate, build and manage connections and memberships to relevant online networks and communities that can help them in staying updated in the skills and topics relevant for their lives and perceived work areas. They should be helped to develop self-regulated learning skills for understanding and monitoring their learning needs, progress and results.

5.1.2 Lifelong learning workers and citizens

Find and participate in relevant networks and communities. This research has shown that there are plenty of different types of networks and communities, and new ones are emerging all the time. Research indicates that online communities can provide many types of important support: emotional, task-related, personal and professional. It is suggested that everybody should go and have a look at networks and communities in their areas of interest and profession. This would be made easier if communities and associations initiated an open collaborative dictionary, where communities could add their information and get ratings and reviews by the public. This would help prospective new members as it would transparently show collectively-created quality descriptors of the communities.

Keep updating and developing knowledge. Workers and citizens should take the opportunities to follow discussions, developments and innovations through online networks to keep themselves updated on their areas of interest, including work. This requires skills in managing information flows in the digital environment, in order not to be overloaded with information. Work tasks are changing in all professions, and by following the most relevant development arenas, workers can keep updated in their field. Active participation in the discussions and collaboration would contribute to their knowledge and the collective knowledge of the field. Online, it is also possible to easily follow the work of professionals in other occupations, which is relevant to one's own work. For example, teachers in vocational and professional education could, through online networking, keep abreast of the latest challenges, solutions and practices among the workers and workplaces of the field.

5.2 Teachers

Teachers are key players in making change happen in the classroom, as innovators and developers of new teaching practices. They can also enable learners to develop their key competences. At the same time, they are in a difficult position, as they should now create new teaching practices with new tools that are different from those they are used to in their work and knew in their own studies. Therefore, although these implications and suggestions are directed at teachers, it is important that the regulatory and institutional environment enables and encourages them to make these changes happen.

Delegate power to the learners. The instructional model, where the teacher is considered to possess the knowledge to be learned and how to learn it, does not work if the goal is to encourage learners to take ownership of their learning and prepare self-regulated learning skills. Teachers should encourage and allow students to connect school tasks with their everyday lives and interests, and to suggest different approaches from the ones teachers had originally intended. Teachers need to learn to be flexible and innovative. Their role is important in guiding the students to find their own solutions and learn to reflect and evaluate the quality of

their work. Collaboration and peer evaluation within the student group, taking into account the collaboration opportunities in online networks, can support these tasks and give students' learning new value.

Experiment and share. Development of new practices requires one to try out ideas and examples, evaluate their success and be prepared to see that some of them work better than others. Trying out first small, and then larger, experiments helps teachers to develop approaches that work for the local settings, their own groups and environment. They then feel comfortable implementing these approaches as they have been developed and adapted for the specific situation. Communities of educational practitioners provide examples of successes and failures, peers to discuss things with and ask advice from when building ownership of practices. Developing practices in different contexts and sharing with others helps them to develop the profession and an inventory of practices for different settings as examples for others.

Participate in teacher networking. As suggested for all workers, teachers should also find and participate in relevant networking that supports them in their profession. There are many subject-specific, tool-specific or general communities for teaching professionals, which can help with both emotional and topic-specific support. e-Twinning[19] is an important Europe wide network with almost 80,000 active members in December 2009, and for all teachers, it is worth having a look at the partnering opportunities there, as collaborating with other schools and teachers can help with the exchange and development of many kinds of knowledge and practice. E-Twinning Groups are new communities of practice on specific interests, which can help educators to develop themselves, their practices, and the profession.[20]

5.3 Organisations as working environments

All working environments, organisations and educational institutions need to consider and enable innovation and lifelong learning among their staff, for the benefit of the workers themselves and to achieve organisational objectives. Networking plays an important role in both. Below, general suggestions for all working environments are presented, together with some targeted suggestions for educational institutions.

Support and guide the participation of personnel in external networks. Currently, some organisations are banning access to social computing applications, as they consider it a waste of working time or a risk to security. For example, 9.1% of the surveyed US companies had sacked people for revealing sensitive information about the company in online postings (Proofpoint, 2007). Employees themselves, however, say that they use social networking for work purposes, and benefit from online communities for doing their tasks more efficiently (King Research, 2007; Facetime, 2008). Employers should consider online networks and communities that are useful for their purposes and provide clear guidelines for the behaviour that is expected of employees on external networking sites. When participation in certain online communities is of specific interest for the employee and the company, it should be resourced as part of the work tasks, as is often the case with open source software communities.

Encourage and invest in learning of all personnel. As skills needs in jobs are changing and the younger generation is not enough to satisfy the demand for qualified employees, it is in the best interests of all employers to invest in the learning of their personnel. Organisational strategy should encourage all employees to study and possibly obtain new certificates, allowing

19 See http://www.etwinning.net/

20 See http://www.etwinning.net/en/pub/news/news/etwinning_weeks_2009/etwinning_groups_poll.htm

them the time to do so. Employers could gather, in collaboration with the employees, a list of those communities and platforms that are most useful for learning and updating knowledge related to their work. For example, the Microbiology Forum is highly appreciated by some employers who recommend that their employees learn through this community (Aceto et al, forthcoming).

Enable innovation space. In order to develop new working practices, innovations in processes and products, employees need to be given space for freedom and creativity. Employee networking inside and outside organisations increases innovations. For example, Burt (2004) found that people who participate in several communities, developed more ideas, which were considered valuable. Furthermore, encouraging bottom-up collaboration, communication and communities to emerge increases informal learning incidents and shared development of practices inside the organisation.

Educational institutions should apply all the above suggestions. They should enable and encourage teachers to participate in in-service training and obtain new digital and pedagogical skills on a systematic basis. Institutions should allow and encourage teacher networking, sharing resources and using resources developed by others and in collaboration. Currently, this is not necessarily true in institutions, as external resource usage and publication of developed resources may not be encouraged or even allowed. Furthermore, teachers should be encouraged to experiment, reflect and document their experiences, with a culture that accepts that not all of them will be successful at the first attempt. This would require revising work descriptions as well, investing time resources in developing and preparing new practices, updating skills and networking.

5.4 Networks, communities and partnerships

Online and offline networks and communities are governed by their members and managers, not by educational policies. It is not possible to impose rules on the ways these networks and communities should work, neither is this the aim here. The power of communities and new partnerships lies in the way they create innovation and knowledge in horizontal collaboration. However, some suggestions are made in the following sections, on how these environments could support lifelong learning and themselves. These suggestions are also useful for environments, such as workplaces or educational institutions, which would like to encourage networks and communities to support their activities.

5.4.1 Networks and communities

Have clearly stated objectives and rules. Literature (e.g. Lai et al. 2006) and case studies in this research show that community objectives and working methods are an important success factor. They make it easier for prospective members to find communities that they consider valuable and with which they would be interested in getting actively engaged. Furthermore, prospective members consider that clear policies and visible monitoring contribute to the quality of a community (e.g. Andrews et al., 2001). Furthermore, case studies showed that rules encouraging and ensuring freedom and respect for different opinions and members were considered to be a success factor. All of these support diverse membership and collaboration in the community, which in turn contribute to the learning of the members.

Facilitate collaborative activities and support community building. Moderation and facilitation is often needed to support knowledge construction in community discussions and activities, to avoid stagnation and to encourage new viewpoints. Case studies (Aceto et al., forthcoming) and literature (Ala-Mutka, 2008) showed several examples, where facilitation for

collaborative activities was considered essential for the community. Therefore, leaderships need to be supported, both those that emerge bottom-up and those that are established by the platform. Research shows that non-task related communication and interaction is important for providing social affordances that enhance interaction and sense of community (Kreijns et al., 2003). Therefore, it is important that the environment provides space and freedom for these types of interactions as well.

Support learning of newcomers and members. Some case studies show examples of communities with specific approaches for supporting newcomers or helpdesk services for members. These can be effective in teaching members digital skills for online community participation, as well as giving a basic introduction to the community topic. Furthermore, if the community gives visibility to learning-related goals and activities, it can support members' personal development in community-relevant areas, thus increasing members' perception of value in belonging to the community. Allowing prospective members to follow the community activities as observers ('lurkers') provides them a chance to get to know and learn about the community, and be better prepared to become active and contributing members.

5.4.2 Partnerships and connections

Establish partnerships between organisations and communities. As many communities do not necessarily have systematic funding, it may be worth their while considering whether mutually beneficial links could be established with educational or professional organisations. In addition to the money-for-advertisements model, the exchange could be to allow an organisation's students or newcomers to participate and learn with the community, while the organisation would support the community with its expertise and facilitate collaboration on specific topics. This may increase the externally recognised quality of the community, as for example Andrews et al. (2001) found that people consider an online community worth visiting, trustworthy and credible if it is associated with a reputable entity, and has visible policies which are monitored and facilitated by professionals. Another type of partnership is shown by the Open University in the UK with its programme where it reaches and empowers people to start studying through local communities.[21]

Enable horizontal collaboration with stakeholders for developing new practices. As pointed out in the Council conclusions on the strategic framework for European cooperation in education and training,[22] effective cooperation using new, transparent ways of networking is needed not only between the relevant EU institutions, but also with all relevant stakeholders for policy development, implementation and evaluation. Developing collaborative community approaches with various educational stakeholders could help to create Education and Training systems that are more flexible in responding to the changing needs of the society, now and in the future. Open discussions on the meaning, objectives and ways of lifelong learning should be encouraged and facilitated. For example, HEFCE (2009) report on monitoring Lifelong Learning Networks (LLNs) provides examples of developing curricula and training in collaboration and partnerships.

5.5 Supporting measures and regulations by institutions

Enabling innovation and change of practice needs regulations and measures that allow and encourage it to happen, empowering actors to experiment and share in developing systemic innovations. Each country has its own educational context and settings, and innovations often happen at the local level. National policy

21 http://www.open.ac.uk/widening-participation/
22 http://register.consilium.europa.eu/pdf/en/09/st09/st09845.en09.pdf

makers and educational institutions should be aware of European frameworks and objectives, but also know and respect the local contexts, so that when they adapt the overall frameworks they aim to best serve the local environment.

5.5.1 National and regional level

Revise national curricula to prepare new skills for lifelong learning from early on. The needs for innovation and transversal skills for jobs are not only relevant for adults, jobseekers and students in higher education. As these aspects relate to developing culture and attitudes, considering them from early on throughout different levels is important for transforming the education system. Evidence shows that online networks and communities can support the development of important skills for collaboration, engagement, innovation, creativity, expression and cultural awareness with approaches that could be used from early on in education. This is also important because not all learners continue to higher levels in the formal educational system, but they should, nevertheless, have the attitudes and skills to continue lifelong learning and be prepared to benefit from the opportunities of informal online networking approaches.

Support lifelong teacher training. Changes are needed in both initial and in-service teacher training, in order to better prepare teachers for new learning approaches and the cultural change expected to take place. Teacher training should include theories and help teachers to use them for developing and reflecting on their practices. Collaboration and projects could be used for building new knowledge during training, and encouraging teachers to start participating in communities that they can use as support in their professional development afterwards. New pedagogies and tools should be included in the teacher training curricula, and there should be incentives for teachers to participate systematically in in-service teacher training and experiment with new practices.

Develop certification systems for learning outcomes. As recommended by the European Council and the Parliament (2008), all Member States should link their educational systems with the European Qualifications Framework (EQF). This framework allows the development of systems to validate learning outcomes, whatever the way they are learned, be it informal, non-formal or formal. While developing learning approaches for new skills for new jobs, it is important to develop validation systems for new competences at the same time, and listen to different stakeholders in the process. The European e-Competence Framework is an example of a framework, which is developed in multi-stakeholder partnerships to provide profession-specific competence definitions in a way that is compatible with EQF. Cedefop (2008) has developed examples and suggestions for implementing EQF in a way that takes into account different types of lifelong learning.

5.5.2 European level

European regulations and support measures are important for ensuring the opportunity of all Europeans to take part in the new lifelong learning opportunities. They can encourage the development and dissemination of good practice and support safe and secure take up of new digital environments.

Improve access and reduce disparities. Although ICT access, supply and skills in general have been considerably improved in Europe, these factors are still limiting take up, especially in rural areas and for disadvantaged user groups. In some areas, public and educational institutions and small companies lack broadband connections and up-to-date equipment. In addition to basic ICT skills, advanced digital competence is important for preparing people to use participative communities and collaborative content for work, leisure and learning. Support funding could be provided for establishing ICT training and access centres to poorer regions and disadvantaged neighbourhoods, taking into

account not only computer training but also the opportunities available through mobile phones. Structural funds could be used to develop ICT take up, citizens' digital skills and lifelong learning systems for groups at risk of exclusion.

Protect and educate vulnerable groups. Young Internet users face many risks and it is important to raise their awareness of the possible risks, and also provide resources and guidelines for educational institutions, platforms and all citizens on educating and protecting minors in online environments.[23] This is particularly important for teachers, even when they do not use online environments for their classes, as many of their students use them outside of school hours for school-related purposes. In February 2008, 18 major social networking sites in Europe signed the "Safer Social Networking Principles for the EU". This is a set of self-regulation principles and practices, which aims to minimise potential harm to children and young people, and came into force in April 2009.[24]

Develop regulations for data ownership and interoperability. A major challenge for future developments with online platforms and communities is the question of digital rights and digital asset management. Currently, platform licenses are often defined so that the platform has ownership of user data, and users may not even be able to remove their data after they resign from a platform. Regulations are needed to ensure that there are common rules and requirements and guidelines for specific situations as regards the rights and responsibilities of platforms in gathering, storing and using user data, and the rights of users to manage their data.

Recommendations and secure services for identity management. A major concern in the digital environments is that it is often not possible to verify people's identities, especially when communication with children is involved. On the other hand, anonymity is an enabler for expression, which removes social barriers, and an important success factor for participation in some communities. Furthermore, people may want to keep their private and professional selves separate when networking. Recommendations should be made to platforms on how to provide identity management. Official identification services could be made available for situations where reliable identification of certain data, i.e. age, is required. IDABC (Interoperable Delivery of European eGovernment Services to public Administrations, Business and Citizens)[25] is developing cross-border solutions for public services, and similar work is needed for all online platforms and services.

5.5.3 Research and supporting measures

Research on new pedagogies and skills. This report recognises that there is a need to develop and experiment with new pedagogies and didactics that take into account online networking opportunities, allow school tasks to be blended into the needs and practices of life outside school, and prepare learners for lifelong learning, with resources and self-regulated learning skills. Approaches need to be different at different phases of education, emphasising different means and skills. Research is needed to better recognise and understand the transversal skills, how they are supported in online collaboration, which of them could be identified and validated, and how to best do it. Furthermore, large-scale integrated experiments are needed to combine new teacher training, curricula for new skills, new pedagogies and tools, school management for innovation, lifelong learning support and partnerships. For example, the Living Lab approach could be used for this.

European level sharing and networking. As many online communities for educational practitioners and researchers already exist, and

23 See, for example, http://teachtoday.eu/

24 http://ec.europa.eu/information_society/activities/social_networking/eu_action/selfreg/

25 http://ec.europa.eu/idabc/en/home

more are emerging, the provision of a hub, to which practitioners could link and make their best practices visible, might help less advanced practitioners to find the resources and communities they need. European funding for projects could require active participation in and contributions to these sharing environments with documented examples that could be tried out in other environments. Using a joint European level platform, such as the eLearningPortal, would make it possible to gather contributions and links to one place. Furthermore, it could facilitate collective voting by practitioners for the most interesting contributions and gather regularly a compendium of lessons learnt from the collective efforts of teachers and developers. There could also be specific task forces and sharing environments to help Member States to develop their own practices following European models; for example, those that are implementing the European Qualifications Framework approach for validating new skills and competences.

Research on data and identity management. Research is needed for developing standards and solutions for interoperable data management in online networking platforms, which could be implemented in the current systems and would provide data portability. Furthermore, technologies for managing personal data in a portable and modular way are needed, in order to facilitate managing different types of identities, with different certifications. Research and development of technical solutions should go hand in hand with developing regulations and recommendations for this area. Developing standards for data interoperability in platforms, would also make it possible for people to transfer their data to other environments if they so wish. Furthermore, new technical solutions might provide ways to build flexible open platforms where parts of the activities are restricted to members in one organisation (study course, work group), but others are open for all, and people could configure the visibility of their identity in these environments as they want.

Research on engaging and supporting new lifelong learners. Currently, a large group of lifelong learners are people who have already finished their formal education. These learners also have fewer digital skills. In order to ensure and improve their quality of life in a changing society, it is important to empower them with the awareness and skills for self-regulated learning and communication in online networked environments. This requires developing engaging and interesting resources and communities that interest different groups of learners, and also approaches that engage new groups in lifelong learning, getting interested in gaining and validating new skills. Furthermore, it is important to find an effective means of helping people with no experience of the tools, or online communication and self directed learning, to develop the necessary skills for these new environments. For example, sharing examples, such as the personal learning journeys described by Hague and Logan (2009), could encourage people to start learning in different phases of their lives.

Developing viable community and partnership models. More research is needed to find ways to enhance and encourage the emergence of successful communities. Partnerships between organisations and open communities could be mutually beneficial, but also run the risk that successful collaboration is not achieved. Experimentation is needed to find models where educational or professional organisations support, host or link with open communities so that their members continue to engage in them, much as they do in bottom-up communities, and the communities provide additional value for the organisations.

Research on the limitations of informal and non-guided learning. As pointed out in the report, research suggests that instruction with minimum guidance is less efficient than structured and guided instruction. Furthermore, it is likely that not all skills and knowledge can be learned effectively in online collaboration, and there are also skills prerequisites that need to be guaranteed by other means. Research into

the limitations of learning through informal means in online environments is needed. Furthermore, technological solutions should be studied and developed to aid individuals in these environments. For example self-diagnostic tools could be provided for people who want to evaluate their own learning results. Furthermore, user interface research could pursue the development of tools that support learning objectives by shaping information presentation in such a way that they aid human cognition.

Research on limitations and risks. Collaboration and community approaches that work well in offline face-to-face setting may not always work online. Online, people may be more cautious and protective than they are in other discussions, as their written contributions are visible and permanent. There are also security and privacy risks, especially when people have not yet learned the necessary critical skills or to be cautious in the internet environment. Furthermore, there is concern about the risk of getting addicted to the Internet (Block, 2008). This may cause social isolation and problems with relationships in the offline world. For example, in a survey of US adults, Aboujaoude et al. (2007) found that 13.7% of respondents found it hard to stay away from the Internet for several days and 12.4% stayed online longer than they intended very often or often. 5.9% of the respondents felt that their relationships suffered as a result of excessive Internet use. There must be a balance between online and offline activities and knowledge about the risks for people's health and well-being.

5.6 Discussion

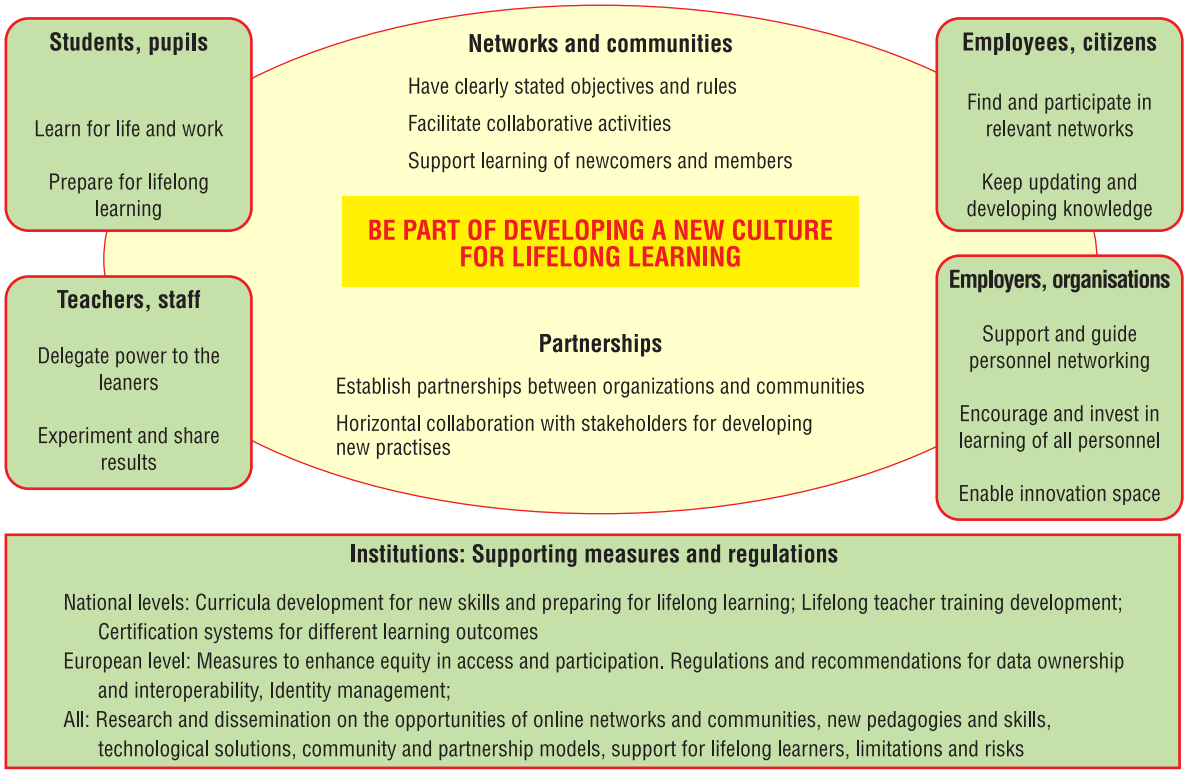
This chapter outlines the implications and suggests ideas for the different stakeholder groups. These implications and suggestions are very clearly intertwined, as there are different types of accountability and interest relationships between the groups. Figure 4 gathers together the points raised in the chapter.

Reaping the benefits of these opportunities requires that all stakeholders, students, teachers, workers, citizens, organisations, and educational institutions engage in changing the educational culture, through collaboration and new partnerships. All learners, whether at schools, undergoing initial or further education, learning while at work or through other activities, should be empowered to take part in learning opportunities in networked online settings. They should be equipped with the skills, awareness and interest for lifelong learning that takes into account all forms of learning opportunities. They should also aim to search for and develop meanings and skills that take into account the relevant social environments and practices. This requires support from the learning and working environments, which should enable and encourage actors to innovate and learn, thus reaping the benefits that informal networking both inside and outside organisation can offer.

Communities can improve their quality and participation rates by supporting the value and learning opportunities they provide for their members. Establishing new partnerships between organisations, communities and interested individuals through online collaboration can provide innovation, knowledge and learning for all participants in ways that are supported by many stakeholders. It is especially important to consider that the successful development of ways to evaluate learning outcomes (as supported by the European Qualifications Framework model) requires that educators, practitioners and employers collaborate to identify and set learning objectives.

Educational institutions need to commit to developing their cultures and practices, finding local solutions that are in line with European objectives. It is important to provide teachers with an innovation space that allows them to experiment and develop new practices. This should be backed up by regulations that enable networking within and outside institutions, so that partnerships with relevant communities can be established and learners can be prepared for

Figure 4: Summary of implications and suggestions for stakeholders



lifelong learning. National regulations need to support institutions by developing both initial and in-service teacher training. Furthermore, educational actors' job descriptions and national curricula should be revised to take into account, right from the early stages of education, the new ways for learning with ICT and the new skills needed for jobs and lifelong learning.

In order to realise the visions of learner-centred lifelong learning with mobility through establishing social and individual learning spaces and resources in the internet (Punie et al., 2006a), the related technologies and regulations must be developed. As there are different providers maintaining data and services, common regulations and recommendations are needed that guarantee the rights of the citizens to manage their data, and, at the same time, provide secure solutions for managing digital identities. Further research should explore the limitations of informal collaborative online settings for learning, the pedagogies required to allow people to benefit from them, and how their features or participation in them could be benefited from for the need for structured and organised learning and education. Overall, these new opportunities provided by the social applications of technologies, which have emerged as a result of initiatives by citizens themselves, seem to provide many new ways to develop learning and quality of life in society. However, governments and educational institutions also have a role to play in ensuring that all people are enabled to participate in them safely and productively.

6 Revisiting the study objectives

The material for this report is drawn from the different project deliverables and from additional analysis, and provides the following answers to the study's research questions:

6.1 What is a learning community?

An online network does not necessarily need to fulfil the requirements of a community in order to support learning by its participants. Many people participate as networked individuals, learning through following the activities and products of others and producing their own reflective and creative contributions. Connections and interaction are important for activities and learning, but can be short and specific. People gather their own sets of connections which they often maintain both online and offline. These can be considered as their personal portable communities, based on social ties instead of geographic factors.

Communities can be defined as collectives of people with joint purpose, policies and interaction, and when these are facilitated by technologies, they are referred to as online communities. It is possible to feel social presence, have a sense of belonging, and reciprocal interaction in these online environments, which provide participants with important emotional support for exploring and developing their identities and ideas. Commitment to and identification with joint community objectives supports collaborative working and learning, developing both individual and collective knowledge. Online communities can be created and nurtured by, for example, an educational institution or workplace, but with social computing these communities often emerge bottom-up, possibly under the umbrella of a larger collaborative platform, such as Wikipedia or Facebook.

Typical activities in online networks and communities include: reading resources created by the community, discussions and other personal contributions of participants; sharing creative contributions with others; observing and following others; interacting with others; participating in collaborative task and production. Not all people participate in all the activities, but they can still identify themselves as active participants and community members. Furthermore, all these activities can have effects on learning.

6.2 How do people learn in these communities?

Through the different networked participation activities, people learn through practice and in interaction with others. Online networked settings facilitate:

- active knowledge construction,
- social and situated contexts for learning,
- learner-centred ways to structure learning, and
- new ways for informal and implicit learning.

Individuals need some basic skills in order to start participating, but once they do, these skills can be improved through the participation activities. The skills can be improved in interaction with others on any platform, but participating in a community with actively engaged members may increase the amount of interaction and feedback as well as the individual's own commitment to learning. The basic factors which enable participation are interest in and awareness of the online platform/community and its purpose and digital skills. Communication skills such as listening, expressing, accepting, advising, defending opinions, considering, reflecting and discussing with openness to new ideas are

important for enjoying and learning from social interaction. And finally, skills to be creative, produce, negotiate, receive and give comments and get engaged with and take responsibility for the community purpose help people make constructive contributions and learn from the processes and products. The specific factors that can enhance learning are 1) a broad perception of learning and seeing it as personally relevant; 2) motivation and interest to learn when participating; 3) skills for self-regulated learning; 4) commitment and identification with the community purpose, members and culture.

The community can encourage participation by having clear objectives and rules, which contribute to the perceived value of the community, by providing flexible opportunities for participation and interesting tasks for members on different skills levels, by supporting moderation and leaderships, and by having an encouraging interaction environment that engenders trust and sociability. Specific measures that the community can take to encourage and help its members to learn are to: 1) acknowledge and make visible learning in the objectives and activities of the community; 2) facilitate technical, topic-based and cultural learning for newcomers and members with support services and resources; 3) facilitate collective knowledge building, for instance, by moderation and documentation; 4) encourage and enable diverse membership. Supporting these learning aspects for the learning of the members also contributes to the factors that encourage participation in the community.

6.3 What is the role of creativity and innovation?

Creativity and innovation are supported online in both open networks and committed communities. ICT tools and media support drafting, publishing, improving quickly and in multiple forms. Social online environments allow people who are interested in commenting, revising or simply rating, to express their contributions, and enhance the ideas and products. Networks and communities exist on almost any possible topic, providing people with possibilities to connect with other people interested in similar issues. Therefore, these environments have great potential for supporting individual and social creativity.

Through weak ties, people can follow large numbers of activities and inputs and get new ideas from a great variety of sources. Research shows that people who are following different communities, can create more and more useful innovations, by combining and applying ideas from one environment with the ones in the other. Furthermore, they have a choice of several places to express their own creative ideas online in their personal publications to get reactions from others.

In online communities, the people have strong ties with each other, common practices and history, which support member communication and understanding. An open attitude to collaboration can lead to rapidly developing community resources and products, and people's creative ideas and work gets mixed and expanded by participants from diverse cultures and backgrounds, but with the same interests. Openness to collaboration attracts a great number of participants, cross-fertilising ideas in new combinations. In addition to creating new ideas and common products, communities with people from the same practice can also quickly evaluate and spread the best new innovations by putting them into practice in their environments, which also benefits people outside the community.

6.4 Do learning communities support equity?

Online communities can enable participation and through it more active citizenship on the part of people at risk of exclusion, such as disabled people, sexual and other minorities, or immigrants. The opportunity for anonymous participation can also be an

important enabling factor for advice seeking or accessing a new community. For people who have problems in expressing their identities in the local neighbourhood and community, online communities can provide a sense of belonging, help them to accept themselves, improve their experienced quality of life and also make them more engaged in other activities in society.

Many online networks and communities encourage people, regardless of their ethnicity, geographical background, or education, to participate. They therefore provide an equal setting for collaboration and participation in tasks based on personal skills that can be further developed through participation. However, in reality, many requirements need to be met before people can start participating: for example, they must have access to ICT, the skill to use ICT confidently, communication skills (often in English language), some previous knowledge of the community topic, and sometimes a particular membership or a professional certificate. These requirements may mean that a person who needs to learn about a particular topic or profession cannot enter the relevant online learning community. People with higher educational level tend to be more motivated and aware of opportunities to continue lifelong learning. Therefore, empowering and engaging people with lower education levels or social class need special attention.

6.5 What are the challenges for benefiting from learning in networks and communities?

There are several challenges in aiming to benefit from the learning that takes place in environments with strong informal and implicit elements. Typically learning in online networking and collaboration does not follow pre-defined paths but very individual activity and learning trajectories. Therefore, it is difficult for learners to show what they have learned and what their state of progress is, should they wish to demonstrate to the outside world the skills they have obtained within the current community. Furthermore, without systematic guidance for learning, there is a risk of misunderstandings and ineffective routes of inquiry, which may even lead to mis-learning

Taking into account informal networking and community activities for formalised learning objectives is not straightforward. Evaluating learning results of the informal activities may change the activities and, thus, the learning results. A further challenge is the type of competences obtained. They are often holistic and transversal and it is difficult to recognise and evaluate their transferability to work or study environments. Learning is not always recognised even by the learners themselves. More research is needed to understand the skills that are learned and improve awareness of these of different stakeholders in the educational system and the job market. Learning in online communities in collaborative settings does not necessarily work for all skills, and requires some basic prerequisites, such as literacy and numeracy. Furthermore, it may not work for those skills which require hard systematic work in order to achieve long-term objectives. Therefore, the role of traditional institutions and expert teachers remains extremely important for the learner's basic development.

Embedding collaborative networking and community elements into formal settings has several challenges as well, as the appropriation of the tools to formal purposes may change the way they are used. More research and best practices are needed for finding ways to embed elements that support formal tasks with informal encouraging community elements, motivating students to commit, work and learn together. This requires also new models, training and attitudes for the teachers, who should provide and allow freedom for the students in their collaborative tasks, encouraging them to develop into self-organising community.

Although online networks and communities provide opportunities for all lifelong learners, many of them may lack critical media literacy skills or self-regulation skills for learning. Participation in the communities and networks does not guarantee learning as such. Users with lower initial skill levels especially may need scaffolding. Furthermore, if they are to participate effectively and learn in online communities, their advanced digital competence and their critical evaluation skills in producing and using resources and collaborating with others must be nurtured.

6.6 What is the role of ICT in learning communities?

ICT is crucial for online networks and communities, as it allows them to form and provides specific affordances for learning by enabling new ways to encourage dialogue, reflection, experimentation, and creativity. It links people to resources and enables groups to form and work despite distance between members, and to create their virtual digital communication and resource repository environment.

ICT supports a social experience which is different from face-to-face settings, in that it can be more continuous and allow a wider range of people from various locations, cultures and professions to collaborate than would otherwise be possible. Internet-based communications can provide new freedom for people with limitations in the offline world, such as disabilities or for dispersed groups that could not otherwise stay in touch. Overall, ICT-enabled networks provide a multitude of new opportunities to belong to communities and connect with others, to get engaged in almost any topic and find and mobilise others with similar interests. Therefore, individual learning and life trajectories can be built on a new scale by combining different social contexts through the various opportunities that can be reached through Internet.

ICT is also a challenge for participation, as it requires basic access to the equipment and internet access. However, taking into account mobile technologies and Public Internet Access Points, which are often available for people from less advantaged social groups, the technical access barriers are becoming smaller. However, skills barriers remain - i.e. both the basic skills needs that are perceived as barriers by the users themselves, and the advanced skills needs for managing privacy, security and critical and responsible attitude to the digital media, which sometimes are not realised by the users themselves. Therefore, learners and users need to learn digital participation skills that they do not necessarily perceive, and the community can play an important role in inculcating the attitudes and precautions for digital tools.

6.7 What are the challenges and opportunities for policy?

Informal online collaboration and networking provide new tools to complement institutional education in creating future learning spaces that enable meaningful and learner-centred lifelong learning in the knowledge society. They can contribute to the new European Youth Strategy[26] integrating youth, society and learning and provide all citizens and learners with new means to learn New Skills for the New Jobs[27] in the changing economic and social situations. Overall, they contribute to all four strategic objectives as defined in the Education and Training strategic framework for 2020:

1. Online communities are becoming an important element in the lives of many people and could be a key tool for the desired *lifelong learning continuum,* enabling people to learn throughout the course of their lives in order to develop relevant skills for

26 http://ec.europa.eu/youth/news/news1458_en.htm
27 http://ec.europa.eu/social/main.jsp?catId=568&langId=en

their jobs and lives. However, educational institutions need to prepare both themselves and the learners for this, and there needs to be support and encouragement systems for those already past their initial formal education.

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 *effectively provide relevant knowledge, skills and competences*. Furthermore, they can provide new collaboration means for educational stakeholders to improve the response of institutional curricula to the needs in the workplace and society. However, this requires the revision of strategies for curricula development, learning methods and objectives and assessment approaches in institutions.
3. The diversity of opportunities and ICT affordances for personalisation in online communities can support *equity and active citizenship,* after the initial barriers related to access, skills and attitudes for participating in lifelong learning in online settings have been overcome. New groups of people can find and create learning and participation opportunities that are relevant and interesting for them. However, this requires specific support, training and encouragement for individuals that are not yet aware or capable of accessing these opportunities.
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, with the means to also develop horizontal collaboration between institutions and with other stakeholders. Institutions need to empower their actors and enable innovative space that allows experimentation to take place and develop into systemic innovation.

It is important that educational institutions learn from these new learning approaches and settings 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.

7 Conclusions

This report synthesises the results of the project that was launched by IPTS with DG Education and Culture to study the innovative social and pedagogical approaches to learning emerging in new ICT-enabled collaborative settings. The study has:

- provided an overview and understanding of new learning communities that are characterised as socially and pedagogically innovative, identifying the innovative dimension;
- provided an overview and analysis of novel learning and teaching approaches and strategies based on active learning approaches in these communities (such as creative problem solving, discovery, learning by doing, experiential learning, critical thinking and creativity);
- investigated the specific role and contribution of ICT in developing and enabling new collaboration models bridging various learning settings (formal, non-formal and informal);
- analysed the relationship between ICT, learning and new models and innovations in view of changes in the delivery of learning;
- proposed avenues for further research and policy-making.

Social technologies have seen an unprecedented take up. They are now used for various purposes by different groups of citizens, and have also been appropriated for new social activities. Through online spaces, citizens can access resources, and follow, interact and create with people globally. They can connect with each other ad hoc for a specific question or task through blogs, wikis, social bookmarking, virtual worlds, podcasts, RSS feeds, media sharing, and social networking sites, which provide them with the opportunity to easily launch new social and collaborative approaches. Traditional location-based communities are losing significance for many individuals who have created their own personal mobile communities through networks. Online networks and communities connect and link people from different settings, around a joint topic, production or for socialising. They therefore have important potential for all citizens as they are open and common spaces where:

- anyone can access task or emotional support, or learning resources, at any moment in their lives;
- people are exposed to, and can explore, many different cultures, practices, and opinions, and can develop themselves as people and professionals;
- informal socialising and interacting with others takes place and leads to informal learning incidents;
- new knowledge, practices and innovations can be developed with multiple perspectives through contact with experts from different environments;
- collective and collaborative initiatives can be launched and carried out, and valuable resources result from the contributions of many parties;
- organisations and individuals can meet and interact on an equal footing in a way that is transparent and open.

Online networks and communities have major potential for the Education and Training policy objectives, i.e. in modernising educational institutions to support the lifelong learning continuum with new opportunities for equity, quality and efficiency, learning key competences and transversal skills. However, this requires an important change in thinking about lifelong learning, so that it is seen from the learner's perspective, taking place all the time in various situations, instead of from the learning providers' perspective which emphasises planned

educational situations and activities. Many of the current systems and attitudes are not compatible with such an open and learner-centred perspective among the learners, education providers, or employers. There are three major needs for change:

- learners should be better empowered and enabled for lifelong learning with all available learning opportunities;
- the efficiency and relevance of education provision and learning support should be improved to better take into account the digital and social reality in which learners and citizens live;
- there should be a shift from certifying education to validating learning outcomes, which would help to identify, pursue and demonstrate competences and skills for different purposes.

Reaping the benefits of these opportunities requires that all stakeholders, students, teachers, workers, citizens, organisations, and educational institutions engage in changing the educational culture and developing lifelong learning opportunities through collaboration and new partnerships. Educational institutions need to support teachers with an innovation space that allows experimentation and development of new practices. This should be supported by promoting networking inside and outside institutions, establish partnerships with relevant communities and focus on the need to better prepare learners for lifelong learning. Education providers need to commit to developing their culture and practices, finding local solutions that support European objectives. These need to be supported by Member States with suitable national regulations. It is suggested that:

- Educational institutions should empower teachers with an innovation space that allows experimentation and development of new practices;
- Educational institutions should empower and enable actors to network within and outside institutions, establishing partnerships with relevant communities, in ways that benefit learning and education of the teachers and students;
- Member States should develop initial and in-service teacher training, in terms of modernising both content and strategies to encourage continuing participation;
- Member States should develop national curricula which take into account the new ways for learning with ICT and the new skills needed for jobs and lifelong learning, from the early stages of education;
- Member States should develop, implement and share practices in collaboration with stakeholders for validating learning outcomes following the European Qualifications Framework.

It is important that there are European-level measures and regulations to support the implementation of a learner-centred lifelong learning vision through social and individual learning spaces and resources on the internet. It is suggested that:

- Measures to improve ICT access and reduce disparities in ICT skills are still needed, especially in poorer regions and groups at the risk of exclusion. Partnerships between ICT-based networking and learning activities and various local communities could provide new opportunities to engage these groups;
- European-level networking, sharing and development of practices and results should be encouraged to develop common guidelines and example resources for educational organisations;
- Research funding instruments should encourage the exploration of limitations and pedagogies for benefiting from learning in informal collaborative settings, and how to best combine these approaches with organised education;
- Common regulations and recommendations should be developed to guarantee citizens' rights to manage their own data, and to provide secure and interoperable solutions for managing digital identities.

Overall, these new social technologies and approaches provide many new ways to develop learning and improve quality of life, emerging from the initiatives and innovations of the citizens themselves. It is important that institutions and policy makers engage with these initiatives and environments in order to find the best ways to open up and modernise their own processes for the 21st century Learning Society. Furthermore, governments and educational institutions have an important role to play in ensuring that all people are empowered to participate in them safely and productively.

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Abstract

In 2008, as part of its policy support for DG Education and Culture, IPTS launched a study to explore the innovative social and pedagogical approaches to learning that are emerging in new ICT-enabled collaborative settings. This is the final report on the project.

Lifelong learning plays a crucial role in society today as jobs, and the skills they require, are changing. Recent technological and social developments in online settings have the potential to support lifelong learning in new ways. Online collaborative spaces can support both intentional and non-intentional learning in new ways through various forms of participation. These online platforms, networks and communities support learning all the key competences for lifelong learning, including new transversal skills and personal growth in a social context. However, ensuring digital fluency and self-regulated learning skills for all becomes a crucial challenge and enabler for lifelong learning. Furthermore, individuals need to be prepared for and interested in learning. Communities can encourage their members to participate and learn with a sociable, openly-managed and developing culture.

The report argues that online networks and communities can contribute to all the major European Education and Training policy objectives, i.e. modernising educational institutions to support the lifelong learning continuum with new opportunities for equity, quality and efficiency, and learning key competences and transversal skills. However, a new learner-centred approach for lifelong learning by learners, education providers and employers is needed. All education stakeholders should engage in developing lifelong learning opportunities through collaboration and new partnerships.

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