

## Microlearning: a strategy for ongoing professional development

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### Summary

In this paper we introduce microlearning in online communities as a learning approach triggered by current patterns of media use and supported by new technologies, such as Web 2.0 and social software. We delineate microlearning as a “pragmatic innovation” to lifelong learning due to its capability to support flexible learning that can be easily integrated into everyday activities, supporting individual learning aims and needs.

First, we explore the concepts of microcontent and microlearning in the context of Web 2.0, social software, eLearning 2.0, personal learning environments, and informal and work-based learning, observing its innovative approaches to lifelong learning and reflecting the needs of current web users. We then identify underlying design principles and distinguish two main aspects of didactical design, i.e. (1) design of microcontent and (2) design of microlearning activities. We continue by presenting the ten key features that we identified to help distinguish microlearning from more traditional eLearning formats, such as web-based trainings, termed “macrolearning”.

Following this overview, we illustrate how microlearning can contribute to lifelong learning by bridging the gap between formal and informal learning and present a case study of a microlearning scenario. We argue that microcontent and microlearning, enhanced by Web 2.0, provide a viable solution to fast-paced and multitask-oriented patterns of learning and working today. Microlearning, aligned with formal learning and embedded in online communities, has the potential to support ongoing professional development.

**Keywords:** informal learning, microlearning, microcontent, online communities, Web 2.0

### Introduction

Current technological, economic and social changes trigger the need for new concepts and strategies to support lifelong learning. Education, including work-based learning, is in need of transformations, requiring renewal and innovative ways of relating appropriately to the way we live, work and learn today (Downes, 2005; Kuhlmann & Sauter 2008; Chisholm 2005).

The terms describing how we work and learn today, such as “knowledge workers” (Tapscott, 2006), “digital natives”, “digital immigrants” (Prensky, 2001), “new millennium learners” (OECD, 2006) and the “Net Generation” (Oblinger & Oblinger, 2007), reflect some essential changes in modern societies, “where digital technologies form an inextricable part of daily life” (OECD, 2006). The way of life of a new generation, i.e. those born from the 1980s onwards, but also of older generations, is becoming strongly influenced by the Internet and related technologies. Both younger and older learners take their laptops to classes or work meetings, use mobile phones and the Web to foster social networks, employ digital devices to play games and create content, or multitask engaging into different activities at the same time (Roberts, 2007).

Web 2.0 technologies bring about such socio-cultural changes as the “do-it-yourself-culture”, reflected in the grassroots journalism or Open Educational Resources, with individuals becoming actively involved in co-creation of cultural assets beyond formal structures, changing from consumers to producers, thus becoming so-called “prosumers” (Toffler, 1980; Bowman & Willis, 2003; Kuhlmann & Sauter, 2008). These new digital technologies enabling the creation of user-generated content have given rise to a trend towards microformats, i.e. short, simple and targeted information (Allsopp, 2007; Masie, 2006). Together with personal publishing systems, such as blogs or wikis, it has become fairly easy for anyone to create own content, including microcontent. Microcontent, i.e. “information published in short form”, relates more to “a formal approach of how to present content” rather than the inherent quality of the content itself (Mosel, 2005; Lindner, 2006). Examples of microcontent include podcasts, blogposts, wiki pages or short messages on Facebook<sup>1</sup> or in Twitter<sup>2</sup>. Creating, publishing and sharing of microcontent on the Web open up new possibilities for implicit, informal and incidental forms of learning, such as microlearning, the term referring to short learning activities with microcontent (Lindner, 2006; Robes, 2009; Hug, 2010).

This paper discusses the concept of microlearning in context of lifelong learning and reports on a microlearning case study from the research project “Mediencommunity 2.0”. Section 2 introduces the concepts of microcontent and microlearning. Section 3 describes key principles of microlearning design. Section 4 presents the case study and illustrates how microlearning can help bridge the gap between formal and informal learning. Section 5 concludes with a reflection on the potential of microlearning for lifelong learning.

## Microcontent and Microlearning

Microlearning has evolved due to the need to focus less on new technologies themselves and more on individual learning needs (Chisholm, 2005; Robes, 2009). Microlearning refers to short forms of learning and consists of short, fine-grained, inter-connected and loosely-coupled learning activities with microcontent (Lindner, 2006; Schmidt, 2007). The term “microlearning” is closely linked to a following concepts:

- **Microcontent**

Web 2.0 and related technologies change the type of information available on the Web towards small and shorter chunks of content, so-called microcontent, e.g. blog posts, wiki pages. Microcontent can be described as “information published in short form, with its length dictated by the constraint of a single main topic and by the physical and technical limitations of the software and devices that we use to view digital content today [...] Today,

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<sup>1</sup> <http://www.facebook.com/>

<sup>2</sup> <http://twitter.com/>

microcontent is being used as a more general term indicating content that conveys one primary idea or concept, is accessible through a single definitive URL or permalink, and is appropriately written and formatted for presentation in email clients, web browsers, or on handheld devices as needed” (Dash, 2002). Thus microcontent is an integral part of microlearning.

- **Web 2.0**

Microlearning in the context of Web 2.0 is viewed as part of a dynamic, open and fragmented digital environment, in which microchunks of information can be individually produced, aggregated, used and reused (Lindner, 2006). Microlearning based on Web 2.0 applications is embedded in a complex digital ecosystem comprising “very small, pieces, loosely joined, permanently rearranging to form volatile (micro-)knowledge clouds” (Lindner, 2006). An important aspect of Web 2.0-based microlearning is active participation of learners in the process of co-creation and distribution of microcontent.

- **Social software**

Social software may be viewed as a major component of Web 2.0 and can be characterized by its capability to support social interaction (Schaffert & Hilzensauer, 2008). Social software brings together learners with different prior knowledge, interests and learning goals through emergent social practice of social networking, collaborative writing or social tagging. Microlearning supported by social software enables not only short and flexible formats or rapid delivery of content, but also social interactions based on that content. This aspect is also an integral part of online communities, where learners connect as they create, aggregate, share, use and re-purpose content, including smaller content chunks.

- **E-learning 2.0**

Microlearning can either take place within emergent microcontent structures such as blogs or microblogs, or it can take place within a designed setting in form of e-learning (Mosel, 2005). E-learning 2.0 can be described as a new approach to e-learning facilitated by Web 2.0 and social software. Unlike e-learning 1.0 focusing on composing, organizing and packaging content, E-Learning 2.0 enables learners to syndicate, aggregate, remix and repurpose content according to individual aims and needs (Downes, 2005). Microlearning can be viewed as E-Learning 2.0 with microcontent (Lindner, 2006).

- **Personal Learning Environments**

Microlearning activities, especially in context of informal learning, can be integrated into Personal Learning Environments (PLEs). PLEs can be described as “a collection of interoperating applications”, which enable learners individual access, aggregation, arrangement, configuration, manipulation, reuse and remix of digital artefacts in an ongoing learning experience (Downes, 2005; Lubensky, 2006). PLEs in combination with mash-up technologies enable “combining existing data and services from several sources” within a single interface (Chatti et al., 2009). In this way PLEs support learners in aggregating small chunks of content, such as feeds and widgets, in a “personal learning center” by pulling external content, combining different content units and distributing the result to different applications (Chatti et al., 2009; Downes, 2005). Microcontent created and used within a PLE can be easily customized, aggregated and distributed through its permeable borders. This allows for a high degree of control over learning, empowering learners with taking charge of shaping their lifelong learning.

- **Informal Learning**

Microlearning is also closely related to informal learning, especially as far as learning context, degree of structuring and format are concerned (Robes, 2009). Both microlearning and informal learning take place beyond formalized structured, e.g. within digital, micromedia environments (Lindner, 2006). Short microlearning activities with a length of a few seconds up to about 15 minutes and can be easily and flexibly integrated into everyday activities. Since microlearning does not demand long attention spans and long-time involvement of the learner, it can be easily used to support on-demand and in-between learning. Microcontent as input and output of microlearning can be created and used in the transition from learning communities through communities of practice to learning networks, bridging the gap between formal and informal learning (Kuhlmann & Sauter, 2008).

- **Work-based learning**

Microlearning is also related to work-based learning with the term “microtraining” used to describe short work-based training formats (Robes, 2009). Microtraining can be used as a component of formal blended learning, as means to support informal learning at the workplace, or as self-contained training (Robes, 2009). As such microlearning can add value to organizations, as it enables flexible learning and requires less investment in terms of time and resources. However, the real value-added of microtraining combined with Web 2.0 and social software is its capability to integrate short formats with user-generated content and social interaction. The recent European Commission report “New Skills for New Jobs” calls for the need to support flexible learning paths, motivation and individual learning for successful lifelong learning (EC, 2010). Microlearning offers flexible pathways to learning, especially in context of work-based learning.

As indicated above microlearning combines different approaches to learning. Microlearning facilitates self-directed lifelong learning, as short activities can be easily integrated into everyday activities. Small learning steps with small chunks of information can be used for learning in-between and on-demand. In this way microlearning enables individuals to stay up-to-date in today’s knowledge society and offers a viable supplement to more time-consuming and formalized modes of learning, such as classroom courses or web-based trainings.

The following table provides an overview of 10 differences between microlearning and larger formats of e-learning in terms of time and scope. To distinguish between these different forms, the term “macrolearning” is introduced to represent such formats as web-based trainings or courses delivered via Learning Management Systems (LMS). In general macrolearning involves more time and larger chunks of content. It is usually based on richer macro-media formats, such as multimedia learning modules or ample learning materials, e.g. text-based scripts or power point slides, and demands longer periods of time to be spent on learning activities, e.g. 1-2 hours. The summary aims at providing a structured overview of differences between macrolearning and microlearning. We believe that microlearning and macrolearning both serve different needs and purposes, and thus should be viewed as complementary, and not as exclusive, forms of e-learning. The following contribution is based on literature review (Leene, 2002; Lindner, 2006; Robes, 2009; Hug, 2010) and findings from the research project “Mediencommunity 2.0”.

		<b>Macrolearning</b>	<b>Microlearning</b>
1	<b>Learning context</b>	formal learning	informal learning
2	<b>Time spent</b>	several hours	a few seconds up to about 15 minutes
3	<b>Content type</b>	learning modules, comprising and structuring a broader range of ideas or topics and combining learning objects	microcontent as small chunks of information, focusing on a single definable idea or topic
4	<b>Content creation</b>	content created by subject matter experts, usually with authoring tools	content co-created by learners with Web 2.0 and rapid e-learning tools
5	<b>Content aggregation and fragmentation</b>	learning objects usually need to be combined with other learning objects to enable full understanding; content can be easily split for re-use and restructuring	microcontent units are self-contained as they can be understood without any additional information; microcontent cannot be divided into smaller pieces without the loss of meaning
6	<b>Content retrieval</b>	courses or topics retrievable through a unique URL, however single learning objects are not addressable	microcontent has a unique URL (permalink), which make even small chunks of information retrievable
7	<b>Structure of the learning cycle</b>	hierarchic, sequential, pre-planned structures consisting of a number of units or lessons, each combining a number of learning objects, such as texts, images, audio, video	dynamic, flexible structures created by learners in the process of learning through syndication, aggregation and modification, based on such data as social tags and bookmarks
8	<b>Target group</b>	learners aiming at gaining an insight into topics defined by domain experts	learners aiming at exploring concepts or solving practical problems
9	<b>Learner's role</b>	learners as consumers of content, attempting to build mental structures similar to those of experts	learners as prosumers of content, building own mental structures through exploration and social interaction
10	<b>Learner participation</b>	focuses on learner-content interactions	focuses on social interactions between learners

**Table 1:** Comparing macrolearning and microlearning

Based on these considerations microlearning can be described as a “pragmatic innovation” to lifelong learning. It is pragmatic, because it is congruent with current information and communication patterns and can be easily adapted to support individual learning needs, especially within informal learning contexts. It is innovative, because it offers a new way of designing and organizing learning, such as learning in small steps and with small units of content, learner-driven structuring and sequencing, co-creation of content, generating and using content through social interaction.

## **Microlearning and Microcontent: Design Principles**

Web 2.0, most notably social software and user-generated content, changes the way Internet is used in general, including learning. The disappearing boundaries between “users and authors”, “local and remote”, “public and private”, transforms didactical design of e-learning (Kerres, 2007). This is reflected in the use of the term E-Learning 2.0:



*“This approach to learning means that learning content is created and distributed in a very different manner. Rather than being composed, organized and packaged, e-learning content is syndicated, much like a blog post or podcast. It is aggregated by students, using their own personal RSS reader or some similar application. From there, it is remixed and repurposed with the student's own individual application in mind, the finished product being fed forward to become fodder for some other student's reading and use.”* (Downes, 2005).

In this view new technologies bring the shift in focus of didactical design. The design of E-Learning 2.0 is more about arranging a stimulating environment in which learning can be initiated and individually managed by the learner rather than predicting the sequence of learning steps and precisely planning instruction. An important part of E-Learning 2.0 is content, which is co-created, modified and used by learners. This user-generated content is not confined to a particular digital space but is distributed and available both inside and outside of learning environments. This “mobility” of content across various platforms is supported by its light format. Microcontent in form of small, loosely-coupled units of digital information can be easily transported, flexibly arranged and individually aggregated. Didactical design of microlearning with microcontent focuses on adequate pedagogical strategies and tools facilitating co-creation and use of content rather than covering a certain scope of content within a specified amount of time.

Didactical design of microlearning is not only about design of microcontent but it is also about designing microlearning activities based on microcontent and resulting in microcontent. As such microlearning raises new questions of didactical design of learning activities (Lindner, 2006). The small format does not imply simplified pedagogical strategies. On the contrary, designing microlearning scenarios becomes even more complex, as it integrates various didactical approaches (Kerres, 2007). Current approaches to microlearning emphasize the role of permeability of learning environments, aggregation, modification and distribution of microcontent, personal engagement and contribution, participation in individual and social learning activities, social group processes, community building and collaboration (Kerres, 2007). The focus of microlearning design is not on hierarchical ordering and sequencing of lessons and courses but on encouraging learners to become active co-producers of content through participation in social practice (Kerres, 2007). However, there still remains a question of new forms of guidance appropriate for learning experiences in environments abundant with microcontent and stretching over different phases of lifelong learning (Schmidt, 2007).

Based on these considerations two main aspects of didactical design of microlearning are distinguished, i.e. (1) design of microcontent and (2) design of microlearning activities. As far as design of microcontent is concerned several key features can be used as design principles, such as format, focus, autonomy, structure and addressability (Leene 2006; Lindner, 2006; Lindner 2008; Robes 2009). These microcontent characteristics are derived from some fundamental concepts from cognitive sciences and linguistics, and may be further explored within chunking models of expertise (e.g. Gobet, 2005) or linguistic concepts of propositions (e.g. Cornish, 2004). The five essential microcontent design principles comprise:

1. **Format:** Microcontent units should be designed as small formats enabling immediate perception, e.g. information presented on the computer screen should be easily scanned at a glance without the need to scroll down, and rapid distribution between different digital environments, e.g. light structure, lower resolution, standard types of output.
2. **Focus:** Microcontent units should have a clear focus and express a particular topic or an idea in the sense of a proposition, expressing what the message is about.

Microcontent units should comprise a distinguishable topical entity, which can be expressed in a single sentence, in a text or in a stretch of discourse.

3. **Autonomy:** Microcontent units should be self-contained, i.e. the information contained should be comprehensible to learners without the need of searching for additional external information. Therefore special attention needs to be paid to context and background knowledge of recipients when structuring microcontent units.
4. **Structure:** Microcontent units should be structured in a way that they comprise at least such elements as title, topic, author, date, tag, URL.
5. **Addressability:** Microcontent should be designed as a single Internet resource with a possibility of direct reference by a URL, such as permalink.

As far as didactical design of microlearning activities is concerned, the following design principles may be distinguished to support microlearning processes:

1. **Microlearning strategies:** Several pedagogical strategies can be integrated to support microlearning, especially self-directed learning (e.g. Knowles, 1975), situated learning (e.g. Lae & Wenger, 1991), community-based learning (e.g. Wenger, 1991). Encouraging co-creation and sharing of content can be guided through principles of collaborative learning and by models of media design, such as process-oriented approaches to media creation and exchange (Davenport, 2004).
2. **Microlearning processes:** Learning processes should be designed as situational, emergent actions, bearing in mind that learning processes can be prepared but not prearranged (Kerres, 2007). The learning process can be designed as a combination of microlearning sessions with each single session taking an average of 15 minutes. A microlearning cycle comprising a number of microlearning sessions can be divided into loosely-coupled phases, e.g. (1) Introduction (topic outline, problem definition, task description); (2) Activity (exercise, problem-solving, text-writing); (3) Closing (discussion, reflection, feedback). Furthermore microcontent units can be assigned to different sub-topics to help learners organize their learning, allowing for individual aggregation and sequencing of microcontent.
3. **Microlearning activities:** Learning activities should be designed as learner-driven or user-generated activities. The environment in which learning takes place should encourage learners to explore, use and create content and provide tools to actively participate, e.g. through text editing, commenting, tagging (Kerres, 2007). Microlearning can comprise such collaborative activities as mind mapping, text-editing, tagging, bookmarking, mediacast production, generation of glossary entries, interactive picture or film scripting, etc.
4. **Microlearning materials:** Microlearning materials should be actively co-produced, assembled and modified by learners. Learning materials can be used as attachments or links to microcontent units to direct learners' attention to key topics and allow further exploration of the subject matter. It is essential to find the right balance between short format and additional information. In order to avoid information overload microlearning material should provide concise, yet coherent and understandable information.
5. **Microlearning in learning communities:** Microcontent which is created through microlearning activities can be distributed within a learning community and used by different learners for different purposes. Therefore microcontent must be addressable based on permalinks, categories or tags. In this way microcontent can serve as a topic for a discussion in a community-based interest group, as a learning material for individual learners or as a basis for a new user-generated content. As such microcontent can be used for designed and emergent microlearning within a community.

Based on the principles for designing microcontent and microlearning activities as described above, a prototype of a microlearning scenario was developed and tested in an online community [www.mediencommunity.de](http://www.mediencommunity.de), which is currently developed in the research project “Mediencommunity 2.0”. The following section describes the didactical design of the microlearning scenario, its implementation, first evaluation results and further applications of the concept.

## Microlearning in Online Communities: A Case Study

Learning in ICT-enabled communities is becoming an essential part of lifelong learning outside traditionally recognized education and training, enabling online collaboration and social networking (Ala-Mutka & Punie, 2009). Research suggests that working age Internet users form the largest group of online community members with major driver of participation being joint environment, joint objective, common interest/situation, self-expression and social connection (Ala-Mutka & Punie, 2009). Although learning is often not named as an explicit goal for participation in online communities, studies show that innovative aspects of online communities, such as different ways of learning, social support or new ways of accessing and organizing learning, have a great potential for enhancing lifelong learning, both in terms of individual and collective learning (Ala-Mutka & Punie, 2009). The research project “Mediencommunity 2.0”, founded by the German Ministry of Research and Education and the ESF, aims at exploring innovative ways of enhancing lifelong learning in the media and print industry in Germany through new learning scenarios enabled by Web 2.0 and social software and embedded in online communities of practice (Wenger, 1998). In this context, an industry-specific community – [mediencommunity.de](http://www.mediencommunity.de)<sup>3</sup> – is developed to provide a social learning environment supporting different types of learners, learning processes and learning outcomes.

One of the core initiatives of “Mediencommunity 2.0” is to provide apprentices in the dual vocational system of education with additional forms of learning in order to support their formal learning in vocational schools, training-on-the-job in enterprises and preparation for final exams at the end of their vocational education. [Mediencommunity.de](http://www.mediencommunity.de) is based on the open source software Drupal<sup>4</sup> and offers its members, i.e. media designers, printers and bookbinders, different ways of connecting with peers and experts and learning enhanced by such Web 2.0 tools as wikis, blogs, microblogs and mediacasts. In this way [Mediencommunity.de](http://www.mediencommunity.de) intends to bridge the gap between formal learning, e.g. within dual vocational education, and informal learning in digital learning environments. The following sections present an example of such Web 2.0-based and community-embedded learning scenarios as a case study for microlearning with microcontent. The case study of the virtual study group for exam preparation in technical English illustrates how microcontent can be co-created and used in different contexts enhancing lifelong learning.

### **Context of the Case Study**

[Mediencommunity.de](http://www.mediencommunity.de) provides a Web 2.0-enhanced environment which can be used for communication, learning and collaboration, especially in the context of informal learning as part of lifelong learning. Currently this environment is predominantly used by young learners in their mid-twenties. Approximately 65% of currently 1,400 registered community members are

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<sup>3</sup> <http://www.mediencommunity.de>

<sup>4</sup> <http://www.drupal.com/>



apprentices at different stages of their dual vocational education. These young adults use Mediencommunity primarily as an environment for informal learning parallel to classes at vocational schools and training on-the-job as two components of formal dual education. The qualification obtained at the end of vocational education legitimates practice in certain occupations in Germany. Therefore adequate preparation for a final examination at the end of vocational education plays an important role for most apprentices. Empirical studies show however, that apprentices criticize their formal exam preparation and assess own learning strategies as deficient (Settelmeyer & Tschirner, 2002). From this perspective it is not surprising that a great number of apprentices use Mediencommunity to connect with peers in order to prepare for their final examination.

It is also interesting to note how apprentices use Mediencommunity. Our statistics show that the average time spent by a community member online is less than 10 minutes at a time. Only 14% of Mediencommunity users stay online for longer than 30 minutes. During core exam preparation periods only 7.5% of learners stay online for more than 30 minutes. These statistics imply that Mediencommunity is used for microlearning by most of its young members.

### ***Design and implementation***

The virtual study group for technical English was designed as a microlearning scenario to support apprentices in their preparation for the final examination in this domain. The virtual study group was open to all Mediencommunity members and comprised 57 registered participants. The average age was 25 years and 86% of participants were female. This scenario stretched over a period of two months from March until April 2010 and comprised altogether 40 microlearning sessions taking 10 to 15 minutes each. The microcontent used in this scenario was derived from official exam topics. Microcontent units in form of exam preparation tasks were grouped into three main sub-topics, i.e. correspondence, manuals and presentations in English, with each sub-topic comprising 10 microcontent units. With microcontent units as the core of each microlearning session, microlearning on examination topics comprised 30 sessions. Additionally, 5 microlearning sessions were planned at the onset as “introduction” (getting to know each other and the environment) and 5 sessions at the end as “closing” (consolidation and reflection). Learners were recommended to plan one session a day during the working week to avoid last-minute drill. However, each learner could decide when, where, how and in what sequence they used microcontent for learning and organized their microlearning sessions. The exam preparation was supported by two moderators, whose role was to design exam preparation tasks and facilitate both individual and group-based exam preparation processes.

In this scenario wikis were used as a primary Web 2.0 technology used to support both individual and group-based learning. The application of wikis comprised wiki-pages for each task related to the three exam sub-topics and a wiki-based glossary for technical terms, both used as microcontent. Examination tasks consisted of two components, i.e. (1) task description designed by moderators and based on a template created with Drupal, and (2) task solution in form of user-generated content, e.g. text translation or a problem solution. The template with the language activity focus was designed to support both collaborative and problem-based learning, guiding learners through microlearning sessions. The template provided different areas to define a microlearning activity, i.e. topic, number and title of the session, activity type, learning aims, description of a problem/situation/task and duration. Both moderators and learners could use the template to design tasks for exam preparation. User-generated content was created individually or collaboratively depending on task type and added as a wiki sub-

page to the main task page. In this way microcontent integrating task description and task solution in one unit was co-created by learners.

Figure 1. Template for designing microlearning activities

When accessing the virtual study group for learning, apprentices could use different elements to design and organize their microlearning sessions. Each session could comprise learning with any of the available components, i.e. using an exam task designed by moderators, designing own exam task, generating an individual task solution, co-creating a collaborative task solution, generating an individual glossary entry, co-creating glossary-entries, commenting on a task, commenting on a task solution, rating a task, rating a task solution, or any combination of these components.

Figure 2. Example of a microcontent unit based with user-generated content

## ***Study Design and Results***

A survey research design was selected for this study to investigate the perceptions of apprentices regarding the suitability of the microlearning scenario for final exam preparation. The learners' questionnaire with closed questions has been implemented as a primary survey instrument so far. In-depth interviews, moderators' questionnaire and qualitative analysis of wiki-pages are further data collection methods planned in near future. 14 out of 57 registered participants submitted complete questionnaires, which makes the return rate of 25%. All items were assessed on a 6-point Likert scale from 1 "very high" to 6 "very low". Item responses were dichotomized for the purpose of this paper. The preliminary descriptive results based on learners' responses show that most of apprentices assessed their prior competence in technical English as *low* (72%) and their language competence after participating in the group as *high* (86%), indicating (perceived) substantial competence growth. Similar results relate to media competence (defined as use of wikis for group-based learning), which was assessed as *low* by 72% of participants prior to and as *high* by 79% after group learning. Key aspects of the microlearning scenario were rated as facilitating exam preparation by most participants with very positive results ranging from 1 and 3 points, e.g. exam preparation tasks were rated with 1.3 and moderators' comments with 1.5 points by all participants. 86% participant rated user-generated task solutions with an average of 2.2 and 79% glossary entries with 2.8 points.

Most learners (93%) found the time invested in learning, i.e. 10 to 15 minutes per day, as appropriate. The content was interesting to all learners and 86% enjoyed learning together in the group. The majority of learners (93%) believed that what they learned was important for their final exam. All learners stated that they felt well supported by moderators, had enough opportunities to bring in their ideas, share information and decide about what, how, when and where to learn. All participants stated they would recommend this type of exam preparation to their peers.

These positive results are based on a small sample size and cannot be regarded as conclusive. Also evaluation is not completed yet. However these preliminary results already offer a first insight into how young learners perceive microlearning. Our research reveals that young learners can easily integrate microlearning into their everyday activities at school and at work to supplement their formal education. Most participants positively assessed learning benefits and reported to us how useful the virtual study group was for exam preparation. However, engaging learners in collaboration proved challenging. Moderators observed dominant self-paced and receptive patterns of learning, such as providing own solution rather than modifying an existing one or reading a task solution provided by other learners. Accordingly, most participants (86%) stated they preferred to learn alone rather than in a group. Also analysis of responses indicates that 69% of participants were engaged in receptive learning as opposed to productive learning. A more comprehensive analysis of data will be undertaken to explore further aspects of microlearning in online communities.

### ***Further applications***

Microcontent created as part of the above described microlearning scenario was already used to support apprentices in a youth custody center. Two young detainees, with the help of a vocational school teacher, used microcontent units co-created by their peers to prepare for final examination in social isolation. Questionnaire results indicate high rates of satisfaction and perceived high levels of competence growth. Further didactical scenarios, e.g. for work-based learning on print finishing, are being designed in Mediencommunity on the basis of the

prototype described above. The intention is to investigate how informal microlearning enhanced by Web 2.0 can support formal learning in vocational, higher and further education.

## Conclusion

From the perspective of lifelong learning it is essential that key competencies are learned, updated and maintained throughout life (Tapio, 2004). Traditional models of instruction are often not sufficient for continuous skills update and upgrade as they are cumbersome and confine learners to prescribed and closed systems (Fiedler & Kieslinger, 2005). Microcontent and microlearning enhanced by Web 2.0 provide a viable solution to fast-paced and multitask-oriented patterns of learning and working today, enabling learning in small steps and with small units of content through social interaction. Microlearning aligned with formal learning and embedded in online communities has a potential to support ongoing professional development.

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