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COURSE DESIGN MODELLING FOR SELF-DIRECTED LEARNING IN DISTRIBUTED LEARNING ENVIRONMENT

Master thesis

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Introduction

In past few years different social and technological changes have influenced the society and education. Changes in web-development have had strong impact on e-learning in higher education. Recently appeared phenomenon *Web 2.0* has initiated discussions if and how it should be implemented in education. Web 2.0 has been defined by O'Reilly (2005) as the business revolution in the computer industry caused by the move to the Internet as platform and an attempt to understand the rules for success on that platform. Users can now contribute to the web. Concepts like social software and social media refer that web can be now more social space than it was so far.

Social software and *social media* are used as synonymous in this thesis. They represent web-based software programs, which allow users to share data and interact with each other. Although most of the social software programs have not been developed with an educational aim, they have been used more and more in learning and teaching process. The pedagogical aspects of social software have initiated many discussions. Opportunity to select most appropriate social media tools and adapt them with learner's needs creates a possibility to every learner to develop own *personal learning environment* (PLE). In this thesis individual and combined PLEs are referred to as distributed learning environments, which consist of different social media tools and services selected by learner and integrated together as a learning space. Using distributed learning environments means increased freedom and flexibility. The variability of PLEs and independence of managing them persume that learners would be more *self-directive* – they would lead and direct themselves in the learning process in PLEs instead of teacher. However, neither have learners the competencies of being self-directed in PLEs nor have the teachers experiences, how to support self-directed learning in distributed learning environment. This leads the universities towards the need for the development of new course design models, which would support self-directed learning in distributed learning environments with the social media tools and services.

The application of PLEs in academic learning process presumes that the individual differences of these PLEs and the learners‘ preferences of using PLEs for supporting certain learning actions were considered as part of the course designs. Every learner perceives the tools and services differently, that is why developers can not assume that same tools are best for every learner. As most of the social software was not developed for the educational purpose, it is likely that the pedagogical use of these tools can be differently conceptualized by developers, facilitators and learners. It means that developers of course should investigate, how do the learners' perceive the pedagogical *affordances* of the learning environment. The mainstream view on using affordance conception in educational technology settings has considered them as objective properties of tools or functionalities provided by the developers of the tools, which can be perceived and put into function in the context of certain activities (Väljataga, Pata & Tammets 2008). However, according to the ecological psychology, the affordances are emergent as part of the activity system (Pata & Väljataga, 2007) in the interaction of the whole learning setting and the learner with certain intentions.

For developing course design model, which supports self-directed learning in distributed learning environment, it is difficult to take into consideration existing instructional design models, which are quite restricted and do not support learner-centred and bottom-up approach. According to these models learners are not expected to make the decisions about their learning aims and process, but facilitators are. It means that current instructional design models need to be adopted in order to use them in the new learner-centred course design models. This master thesis is about learners and new Web 2.0 learning technology, and tries to offer a new course design model, which promotes learners‘ compentence of self-directing learning in distributed personal and shared learning environments constructed from social media.

The main aims of the study can be formulated as follows:

- To develop the initial course design model for enhancing students‘ self-directed

learning competences at distributed learning environment;

- To formatively evaluate the application of the course design model at Tallinn University through cyclical design-based research;
- To formalize the final course model for teaching self-directed learning competences in distributed learning environments.

The following research questions were formulated:

- What the important components of course design for teaching self-directed learning competences at master level are?
- How do learners evaluate the course in distributed learning environment from the perspective of gaining self-directed learning competences?
- Which learning affordances do learners perceive at the distributed learning environments during the course?
- How can the students‘ perception of the learning affordances of the environment and self-directed learning during the course activities be considered as part of the course design?
- What the important aspects and bottlenecks of implementing the course design in distributed learning environment at master level studies at Tallinn University are?

In this master thesis design-based research as methodology was used to develop the course. The master level course for self-directed learning was run twice, in spring 2007 and fall 2007. The author of this thesis participated at the course as a learner and researcher in spring 2007, conducting the data analysis. She was involved in the planning and data analysis of the course design in fall 2007. Together with two lecturers of the course, two studies were conducted. Study one (Väljataga, Tammets & Pata, under review) was accepted as a book chapter to the peer-reviewed book "Web 2.0-based E-Learning: Applying Social Informatics for Tertiary Teaching". Study two (Tammets, Väljataga & Pata, accepted) has been accepted as the conference publication in the proceedings of the international peer-reviewed conference EdMedia 2008.

In this thesis, the results of the two original studies (publications 1 and 2) have been used to develop the course design model for enhancing students‘ self-directed learning competences. The thesis has two parts. The first part consists of 4 chapters, where chapter 1 provides theoretical framework to the course design model for developing students‘ self-directed learning competences. Chapter 2 gives an overview of the methodology, which was used in the given studies for designing a new course design model for self-directed learning course. Chapter 3 presents an overview of two original publications (referred to as Articles I-II). Chapter 4 discusses the main results from two studies as part of developing the course design model, and presents the answers to the research questions of this thesis. The practical implications of this study are elaborated in this chapter. The second part of the thesis includes two original publications (Articles I-II), which will be published in peer-reviewed conference proceeding and book.

1. Theoretical overview

This chapter gives the theoretical overview of the social media, self-directed learning and the concept of learning affordances in learning environments, which provide the theoretical background for developing the course design model for enhancing learner's self-directed learning competences with social media.

Social media influences today's educational system and learners, and the competence of using social media must be involved in the higher education courses. The modern society has highlighted the need more self-directed learners, thus this competence has to be taught as part of the higher education courses. New social media environments provide learners with the increased possibilities for managing their self-directed learning activities, and therefore the author suggests that the two competences can be taught entwined way as part of one course: Self-directing in distributed learning environments.

However, most of the social media has not been developed for educational purposes, therefore there is the need to analyse what the different pedagogical possibilities and options are that different social media tools and services provide. It is assumed that when performing the learning activities with the technical functions of the tools and services, the learners' objectives and previous learning practices, and the new culture related to the social environments would influence, which learning affordances will be triggered for different learners when using social media. This learner-centred view to the learning affordances of the learning environments must be taken into account in the new course design model.

1.1 Self-directed learning in social media environment

1.1.1 Web2.0 and social media

For past years, there have been lot of discussion that the next generation Internet, often

called Web 2.0 has arrived. Also there has been lot of arguements, whether Web 2.0 is a new web era, a new technological or social phenomenon or neither of them. From the point of view of using ICT in learning, Leinonen (2005) has divided the history of ICT into five periods. Figure 1 describes late 1970's – early 1980's as the time, when first computers arrived in schools and they were mainly used for developing individual learners' skills in mathematics and drilling with computers was used often for language or math studies. Late 1980's – early 1990's the first multimedia elements were presented in computers, at that time educators believed that students would learn if they could watch animations in colours, small video clips and then do the exercises better. At early 1990's learning was influenced by the World Wide Web, although the web-based exercises, were mostly without interactive multimedia, and all users could to do in Internet, was reading text and watching pictures. Leinonen also points out that in the early 2000's, the Internet-based training got mature in the form of e-learning and in the late 2000's, social software made its breakthrough. Considering everything mentioned above, it is often said that, before the Internet arrived, the era in technology could have been called „personal computers". With the development of World Wide Web, it turned into Web 1.0 era, and when the social software started to influence society and education, the era of Web 2.0 begun.

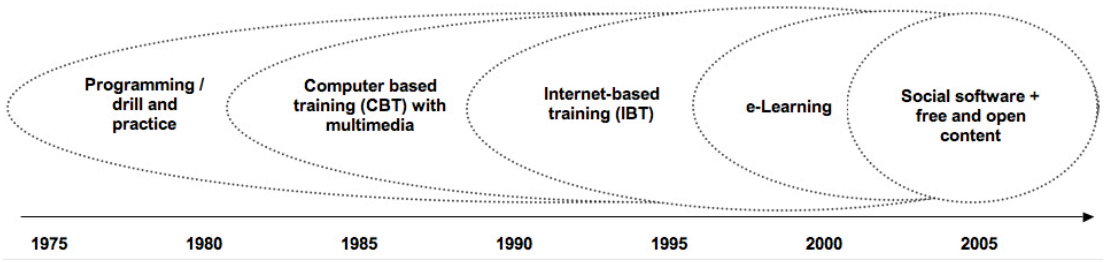

Figure 1. History of ICT (T. Leinonen, 2005)

In the context of this master thesis, the Web 2.0 is introduced as the new era of the Internet. New web is no longer merely an environment, where people are passively reading static websites and looking for information. The new web is more of a cultural phenomenon, where people with their actions actively contribute to the virtual web environment – they use and modify the web contents, the tools and systems with their behaviours and develop new behaviours that have never existed before.

With the arrival of Web 2.0, the *social software and services* and *social media tools* have become mainstream technologies in the web environments. The terms social software and social media have largely been used as synonyms. These tools form the new activity spaces for Web 2.0 culture. Social software report by FutureLab (2006), assumes that *social software* is software that supports conversation interaction between individuals or groups ranging from real-time instant messaging to asynchronous collaboration between teamwork spaces. It also supports social feedback, which allows a group to rate the contributions to others, and finally, it supports social networks to explicitly create and manage a digital expression of people's personal relationships and to help them build new relationships. *Social media* is a selection of tools or services, which can be described with the users' objectives like participation, openness, conversation, community and connectedness (Mayfield, 2007). Social media encourages contributions and reaction from everyone; most of the services are open to feedback and participation. Unlike traditional media, using social media is seen as participating in the two-way conversation. Klamma et al. (2007) have defined *social media* as the whole generation of new socially based tools and systems, which support activities in digital social networks. *Digital social networks* are social networks mainly realised by means of computer-mediated communication. Network culture is a form of culture, which is extremely influenced by communication using global networks, and different social media services have focused just on increasing the new digital culture among users.

There are different categorizations of social media and social software. These categorizations very often lack the consistent basis for categorization, mixing up technological services and social behaviours. For example, six kinds of social media have been reported in the web-based magazine „What is social media" by Mayfield (2007):

- Social networks are sites which allow people to build personal web pages and then connect with friends to share content and communication;
- Blogs are online journals with the entries appearing with the most recent first;
- Wikis are websites, that allow people to add content to or edit the information on

them, acting as a communal document or database;

- Content communities are communities, which organise and share particular kinds of content, like photos, bookmarked links or videos;
- Microblogging is social networking combined with bite-sized blogging, where small amounts of content („updates“) are distributed online and through the mobile phone network;
- Podcasts are audio and video files that are available by subscription;

The report „Social Software and learning“, provided by FutureLab (2006) has taken the different approach to categorise social software. They divide it as follows:

- Mainly text-based social software, which contains:
    - Weblogs, which are easily updatable personal websites. The social aspect of weblogs can be seen in the ability for readers to comment on postings, to post links to other blogs and to keep track to other blogs referencing their posts.
    - Wiki software, which allows people to easily upload content to the Internet, with the important addition that is then editable by other readers. Also can be wikis used as kind of asynchronous social notebook for the specific needs of a small group.
    - Social bookmarking and tagging, which is web-based application that allows users to store bookmarked links to URLs in a format accessible via the Internet rather than searching bookmarks stored on a specific computer.
- Audio-visual social software – it is important to acknowledge that photography, video and audio allow for sharing of ideas and collaborative activity, for example:
    - Youtube – environment for sharing videos
    - Flickr – environment for sharing photos
- Spatial and geographic social software, which are mostly web-based geographic information systems, which combine satellite imagery, maps and search facilities to allow user to access a wide range of geographical information

- Finding like minds – being sociable requires people to be sociable with. There are three principle methods for putting people in touch with each other:
    - Profile matching requires individuals to enter personal details, which are either matched against the profiles of others or searchable by others.
    - Personal networks are shared contact systems – databases of contacts, and contacts of contacts. Often geared to plain sociability or for business contacts
    - Affinity systems allow people to register their membership of groups, such as old school friends or work colleagues.
- Mobile phone software – as the mobile phone devices will come more important in the development of technology, then the software for those applications will also appear. There are software for positioning, locating friends, using marks on real objects in environment, which can be decoded through the mobile phone camera.

Both of the above mentioned classifications of social media and social software are not complete and they have their disadvantages and these classifications should not be completely considered as the final truth. Such descriptions of tools or services are simplistic and not systematic in their explanations. For example blogs have got more important aspects, than just being online journals, or social bookmarking service *del.icio.us*, which has got more functions than just saving URLs web-based, but rather there is strong social side and networking aspect behind the system. The geographic social software should probably considered together with the mobile phone software, as mobile devices mostly support geopositioning and –tagging, additionally microblogging should be considered together with mobile phone software. There are many opinions, how to classify social media, the aspects can be technological, action-based, individual-collaborative issues, artefact-based and so on. One of the possibilities is service-based classification – social bookmarking, collaborative writing, social awareness etc. None of the classifications are totally wrong, although they might have some weaknesses, mostly it depends, on which point of view to look at them – pedagogically, socially, with

marketing interest and then adapt the classifications. Also it must be considered that since social software is in constant development, different types of social media get merged into new systems dynamically and never the exhaustive classifications can be offered as the systems have already been developed further.

Technical distinctions, what make social media ‚*the social media*' can be described as follows:

- Using information feeds to aggregate and mash information and create individual and collaborative distributed environments;
- Tagging and creating social shortcuts with tags;
- Networking and social awareness through networks, also commenting with the purpose of creating networks;
- Publishing and joint creation, which allows everyone to contribute to the available amount of information in Internet.

Some critics of Web 2.0, for example Trebor Scholz (2008), find that there is nothing new in the technologies and cultures of the Web 2.0 and it is certainly not a revolution or new era. Scholz believes that Web 2.0 represents not a socio-technological advance in the World Wide Web, and he also deflates the claims of revolutionary technical innovation and social empowerment, revealing instead that the technologies and communities underlying Web 2.0 have existed, in one form or another, for a long time. Wiki, for example, is not new, Ward Cunningham started developing the first wiki already in the year of 1995. Also blogs are not latest technical solutions, Dave Winer made his weblog in 1996, which is still in process, but probably the first weblog was Tim Berners-Lee's website (available at http://info.cern.ch/), that was started even in the year of 1990 (Winer, 2002). However, these claims about the newness of Web 2.0 only suggest that the era we now label with Web 2.0 started quietly already much earlier when new and more social web technologies gradually evolved. Although the term Web 2.0 may not separate the strict borderline between the old and new web eras of technical innovation, it can certainly indicate the new era of social involvement of using the web technologies

participatory manner. Technical innovations brought together many small contributions of millions of users giving, birth to new social medium that in turn influences now the technical development as well. Even another critic of Web 2.0, David Silver (2008), admits that if not anything else, then next generation Internet gives us writeable generation, generation of young people, who think of media as something they read and something they write – often simultaneously. Web 2.0 was also recognised by the magazine „Time“ by choosing the person of the year of 2006 *You, active Internet user*, who contributes to the web (Grossman, 2006). Magazine Time justifies the decision by saying that Web 2.0 provides an opportunity to build a new kind of international understanding, not from politician to politician, from great man to great man, but from citizen to citizen, from person to person.

1.1.2 Distributed learning environment

Different social media tools and services, including feeds and tags, enable to combine them and integrate distributed social media environments, also with educational purpose. This thesis uses the term *distributed learning environment* to represent the environment, which consists of social media tools selected and interrelated by learner. A distributed learning environment, composed from social media, is not an institutional closed learning management system, but can be managed by learner or the group of learners and the facilitator. A distributed learning environment supports the learner-centred approach to learning and for that reason the environment is quite individualized compared with institutional closed learning management systems. Another characteristics of that kind of learning environment is that it is dynamically changing, tools and services in it can be replaced after some time and combined together using feeds and tags, environment can be expanded according to learners‘ needs.

Talking of environments composed of social media tools, the term *personal learning environments (PLE)* can be used. Attwell (2006) claims that the idea of personal learning environment accompanies the idea that learning is continuing during our whole life and

the learners naturally would see tools to support that learning. Using PLEs in life-long learning also recognises the role of the individual in organising their own learning and learning tools. Moreover, the pressures for PLEs are based on the idea that learning will take place in different contexts and situations and will not be provided by a single learning provider. Every learner in Web 2.0 era, can have its own personal learning environment, which can be developed for the rest of their lives and used to support their life-long learning. This trend is different of what the higher education institutions currently support, while organizing their e-learning mainly in institutional and closed learning management systems that do not support learners to develop the competences to manage their own tools for learning. Rather, they keep learners under restricted systems and separate them from the external knowledge-building communities. Also, in such environments the knowledge artefacts, learners develop as evidence of their growing competence in different areas, are centrally owned, and learners lose the access to the artefacts they have developed during their studies after graduation. This does not ideally support learners to become self-directed life-long learners.

Scott Wilson (2006) has pointed out one paradox related to the era of Web 2.0 – all this socialisation in society and education has taken place due to the personalisation of people in Internet. Distributed and personal learning environments have directed learners to be more social than ever as members of multiple social networks. Using social media in the learning process, promotes the skills of collaboration among learners, which is one of the key competencies in society where globalisation increases and physical distances between people are more common than before. Group blogs and wikis are examples of effective collaborative knowledge capturing systems that support the formation of learning communities. Such communities can jointly design, create, review, comment, modify and post learning objects to the web, supporting the development of real time collaboration competences and providing authentic learning experiences (Klamma, et al., 2007).

The development of the social software technology and the arrival of next generation

Internet era – Web 2.0, have already had a major influence to the society e.g. to the social behaviours, marketing strategies, communication areas. However, the applications of social media in the formal higher education are still very rare. Learners often use several social media services and tools for their social communication and for reflecting their various ideas, but the same practices are seldom applied consciously for their learning purposes. Many students have experience in blogging, they share photos and videos with their friends and they are participants in many different social networking systems, but they don't have the competencies to take the advantage of these tools in their learning process. Mainly it is caused by the lack of using social media tools and services as part of e-learning practices at the schools and universities. Educators may have heard already that next generation Internet has arrived, but yet few of them have insider experience of the new competences and cultures these new environments expect from the users, and they are not ready to use the new tools and services in their own classroom.

Stephen Downes (2005) has proposed a new term for integration of e-learning and social software – *e-learning 2.0*. Downes believes that educators began to notice something different happening when they began to use social publishing tools like wikis and blogs in their classrooms years ago. All of a sudden, instead of discussing pre-assigned topics with their classmates, learners found themselves discussing a wide range of topics with peers worldwide. The author believes that social media tools and services are a good starting point for supporting lifelong learning. Therefore educational institutions should look for more options how to use social media in teaching practice.

1.1.3 Self-directed learning and life-long learning

While web technology and culture has radically changed in the Web 2.0 era, the society has been changing as well. For years, the mainstream way of thinking was that the students will graduate from the schools, then get a long time job in some bigger and hierarchically managed organization, and their learning will be finished with graduation of school. However, for some time now, it has been emphasized that the economical and

cultural progress in mankind is related with constant learning at individual and institutional level, and that learning should be a life-long process. Many European Union programs, for example „Lifelong learning programme 2007-2013“, emphasize the importance of learning in workplace and professional development. They assume that rapidly outdating knowledge in the society, people changing professions, demographic change and economic competitiveness would cause the conditions where life-long learning becomes a necessity. The second premise is that people are so heterogeneous and have different needs, possibilities and competencies. To keep them productive and motivated in their daily actions, they should be encouraged to lead themselves instead of being told what, when and where to learn, they should be more self-directive in order to support their lifelong learning.

Although *self-directed learning* is not new concept and first scholars have mentioned it even 150 years ago (Hiemstra, 1994), it has recently gained a lot of attention. In case of self-directed learning, individual learners are responsible for orienting themselves to learning opportunities, planning of their own learning tasks and assessing their performance (Merrienboer & Kirschner, 2007). Fischer and Sugimoto (2006) have added that self-directed learning is in many cases an essential part of the group- or joint activity. In collaborative learning situations, the goal of learning should be motivated from the learner's point of view, which presumes self-directing competences.

Fischer and Sugimoto (2006) have argued that *lifelong learning* is more than just an adult education and/or training. Rather it is the mindset to acquire, which creates the challenges to understand, explore, and support new essentials dimensions of learning such as *self-directed learning*, *learning on demand* and *collaborative learning*. They also claim that *lifelong learning* is a continuous engagement in acquiring and applying knowledge and skills in the context of self-directed learning activities and should thereby be grounded in descriptive and prescriptive goals, for example:

- Learning should take place in the context of authentic, complex problems;
- Informal learning activities are equally important in lifelong learning and in

formal learning activities;

- Lifelong learning often takes place without teacher;
- Lifelong learning is more than training and more than school training.

Highlighting the lifelong learning perspective, Fischer (1999) has suggested that most of the learning takes place informally out of the classroom, our schools and universities should prepare the learners to engage in self-directed learning process, because this is what they will have to do in their professional and private lives outside of the classroom. He believes that self-directed learning de-emphasizes teaching as a process in which the teacher tells something to passive learners. Rather, self-directed learning focuses on mutual dialogs and joint knowledge construction, enhanced by the creation, discussion, and evolution of artefacts. Learners should develop competencies of how to organise themselves, their learning, social networks and work after the graduating from school, when there is no teacher telling them what and how to do next. In order to organise themselves in the world, where concepts like globalisation, life-long learning and collaboration become more important, getting basic knowledge and developing competencies of self-direction is essential for learning.

Klamma et al. (2007) believe that in the concern of self-directed learning, the emergent Web 2.0 concepts and technologies are opening new doors for more effective learning. For life-long learners the first generation Internet allowed easy access to a vast range of published materials, but the second generation Internet allows them also to contribute into it.

1.1.4 Instructional design models

In the situation, where learners are self-directed, come from different backgrounds, and have different needs and competences, it is complicated to design courses, which are suitable for all of them. There are several instructional design models and theories that can be considered when developing a new learner-centred course design model.

According to Reigeluth (1999), instructional design theories offer guidance on how to better help people to learn and develop, and they really help educators to improve education. Reigeluth has also suggested that good instruction should provide clear information about goals, knowledge needed and the performance expected, but also the opportunity for learners to engage actively and reflectively in the development of the learning design. The instruction should provide clear and thorough feedback to learners, helping them to proceed more effectively. He believes that with the arrival of the information-age following the industrial-age, current instructional design theories are starting to change.

The most widely applied general design model, which can be also used in instructional design and in e-learning, is the ADDIE model, developed in 1975 by Florida State University. Figure 2 presents that ADDIE model, where letters stand for five steps: Analysing --> Designing --> Development --> Implementation --> Evaluation. This model conveys the ideology of sequential and linear design activities.

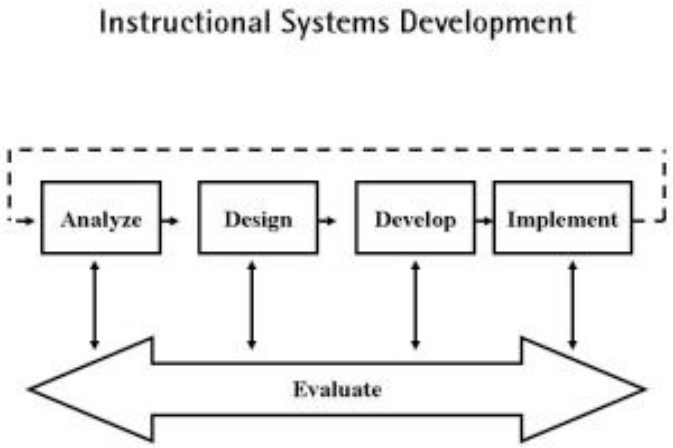

Figure 2. Addie design model

Another widely used step-by-step type of instructional design model developed by Dick and Carey (1978), consists of a series of design events in which the designer establishes the learning objectives and creates the instructional strategy to accomplish the objectives. In this model, little room is left for the individualized instruction. The up-front determination of objectives demands that the learner follows the set of objectives established by the instructor/designer (Passerini & Granger, 2000). Using the sequential instructional design models, which give the decisions mainly to the instructor, is not the best option to be considered, while designing the course model, which aims to support self-directed learning. The instructional design model is needed where the individual learners‘ needs would be considered more important than teachers‘ actions, and the whole control of the course content and development should be co-managed by the instructor and the students.

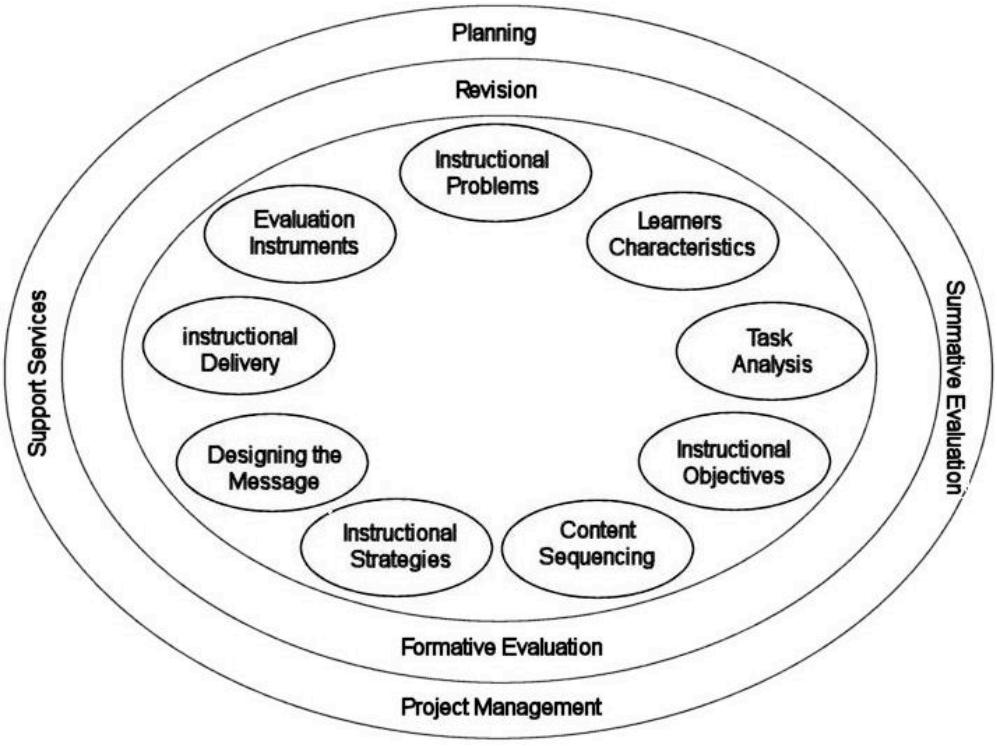

Figure 3. Instructional design model developed by Kemp et al. (1994)

The instructional design model, suggested by Kemp et al. (1994), is a bit less sequentially restricted and takes a more flexible approach to the design. From figure 3, it is possible to

see that this model identifies several developmental phases, mentioned in the Dick and Carrey (1978) model, but does not apply any particular sequential order how the design process should proceed. The focus of design may shift to any aspect of the model as the situation demands it. The model presupposes the continuous evaluation of each design and redesign stage during the development. According to this model the characteristics of learners are taken into account, suggesting that the education is more differentiated. However, while this model allows for a higher level of learner-centred intervention, compared with the ADDIE's or Dick and Carey's instructional design models, the instructor is still the main originator and moderator of learning objectives and tasks. (Passerini & Granger, 2000).

For developing course design for enhancing self-directed learning competences, there is a need for the instructional design model, which supports spiral and learner-centred course design. Most of the traditional courses cannot be designed following by the sequential models, because there is a need for continuous evaluation of the course originated from the learners' needs and course has to be dynamically redesigned several times.

The above-mentioned instructional design models are all process-based models, which are characterised by the step-by-step actions in one certain order. Process-based models are quite restricted and do not take into account individual learners needs. Process-based instructional design models have largely been used to develop courses that target the instructor-determined learning outcomes. They provide well-set outputs and they expect to have a homogeneous target-group, suitable for example for a military academy, but this type of instructional-design models and theories are probably not the best to be followed, when developing new course design, which supports self-directed learning with social media tools and services. In master level studies, self-directed and distributed learning environment, approach to designing the course should be conceptual and take dynamically into account the needs of individual learners. Jonassen (1999) has suggested a collaborative learning environment design model that focuses on the aspects of the constructivist learning theory. His model is conceptual instead of process-based and is

intended to provide guidelines for designing learning environments to support constructive learning. The Jonassen's model accentuates certain spects of learning environment and activity design: building learning around a problem or a learning goal, which is owned by student(s), constructing learning experiences that are active and authentic, building on overall learner-centred approach, increasing collaborative aspects of learning, and increasing the importance of contextuality in learning.

Another design theory for developing electronic collaborative learning environments, provided by Kirschner et al. (2004) claims that question is not anymore, what outcomes specific educational techniques and collaborative work forms cause, but rather what activities they actually afford. There are also often referred to as the *affordances* of a learning environment. Social media tools are typically not developed for educational purposes. Although it is possible to do with one certain device different things, even to build up whole learning management system, which consists only of e-post service, that is not how tools should be used the most purposful way. Different tools are with different action possibilities and there is need for analysing their practicability. For that the concept of affordances from ecological psychology is chosen. Gibson (1977) has defined affordances as *relationship* between the physical properties of an object and the characteristics of an actor (user) that *enable partcular interactions between actor and object*. Affordances must be meaningful so that they can be used and they must support and anticipate an action. Norman (1988) on the other hand, has *linked affordances to an object's usability*, and thus these affordances are designated technological or technology affordances. Norman has maintained that the major problem with most new technological devices and programs is that they are badly conceived and they ignore the human side, the needs and abilities of people who probably use the devices. Kreijns, Kirschner and Jochems (2002) have defined *social affordances*, which are analogous to technological affordances – *properties of learning environment* that act as social-contextual facilitators relevant for the learner's social interaction. And finally, Kirschner (2002) has also defined *educational affordances* as those *characteristics of an artefact* that determine if and how a particular learning behaviour could possibly be enacted within given context.

All these interpretations tend to relate affordances more to the material aspects of the learning environment (tools, artefacts), diminishing the role of other components of activity systems that contextualize which affordances the learner would evoke in interaction. Pata & Väljataga (2007) have related affordance emergence to the actions taken within the activity systems: thus the affordance can emerge if tools, artefacts and people with objectives interact in the community or groups, the rules and norms within such groups and the learning culture may constrain which affordances appear as useful and will be used in action. Educational learning affordances are relationships between the *properties of an educational intervention* and the *characteristics of the learners* that enable particular kinds of learning by them. Kirschner et al. (2004) believe that concept of affordances offers an alternative framework for designing and evaluating collaborative learning environments if appropriated to the educational context. They believe that education is always a unique combination of technological, social and educational contexts and affordances. The design for electronic collaborative learning environments, provided by Kirschner et al. (2004), has six stages:

- Determine what learners actually do;
- Determine what can be done to support those learners;
- Determine the constraints of the learner, learning situation and learning environment and the conventions that already exist;
- Determine how learners perceive and experience the support provided;
- Determine how the learner actually uses the support provided;
- Determine what has been learned.

Still, like Reigeluth (1999) emphasizes, developers of new instructional-design models, should not completely reject and discard the old paradigm, which is the basis of current instructional-design theories, rather the new paradigm needs to incorporate most of the knowledge generated by the previous instructional-design theories.

Developing the course design model, which supports self-directive learning in distributed learning environment, it is recommended to use the conceptual instructional design

model, instead of process-based model. Learner-centred course should be redesigned continually and learners should be important part of course design and evaluation. Yet, since the course model development takes place in time, some processual aspects how certain development process took place can be planned and outlined.

2. Methodology

The chapter is structured to explicate how the main aims of this thesis – developing and validating the course design model – were achieved methodologically. Thus, the chapter gives an overview of how the design-based research and action research methods were used and presents the scheme of the research design.

For developing and validating the course design model the data from two separate studies were used. Some of the research instruments (questionnaire) and data collection methods (analysis of learning affordances from schemes, analysis of essays and questionnaire analysis) in these studies were developed in the participation of the author of this thesis. The author of the thesis participated in the developed course in spring 2007, and contributed to the course design process in fall 2007. The author of this thesis conducted the analysis of the data from the courses held in spring and fall 2007, and participated in the planning of the changes in the course design model in fall 2007. She also developed the research instrument (questionnaire) in fall 2007.

The methods chapter contains the research context subchapter giving overview of the samples and research settings of the thesis. Since the two studies are presented as part of this thesis, the methods chapter does not repeat in detail the descriptions of the research instruments and analysis methods that were presented as part of the separate studies. The chapter gives an overview of how these instruments and data analysis methods were used as part of the course design development.

2.1 Research design of the study

For this study, the design-based research method was used. Wang and Hannafin (2005) have defined design-based research as methodology aimed to improve educational practices through systematic, flexible, and iterative review, analysis, design, development

and implementation, based upon collaboration among researchers and practitioners in real-world settings and leading to design principles or theories. The Design-Based Research Collective (2003) argues that design-based research is an important methodology for understanding how, when, and why educational innovations work in practice. They have claimed that design-based method has got five basic characteristics:

- The central goals of designing learning environments and developing theories or "prototheories" of learning are intertwined;
- Development and research take place through continuous cycles of design, enactment, analysis, and redesign;
- Research on designs must lead to sharable theories that help communicate relevant implications to practitioners and other educational designers;
- Research must account for how designs function in authentic settings. It must not only document success or failure but also focus on interactions that refine our understanding of the learning issues involved;
- The development of such accounts relies on methods that can document and connect processes of enactment to outcomes of interest.

From the point of view of this study (see articles I-II), all of these characteristics are presented as follows:

- Analysis of the demands from the society, as well as, current course design frameworks and their problems;
- Development of the course with theoretical key concepts in order to create a challenging situation for students to encourage their self-directed activities, including their personal selection of mediating technology;
- Evaluation and testing of the designed course in practice. The data were collected based on students‘ activity patterns, open-ended questionnaire and created home assignments;
- Documentation and reflection to produce design framework with its limitations and potentials.

Also participatory research was applied in this study as a research method. It means that

the researchers are self-reflective and study their own classrooms, schools or practices. It aims at the participation of the studied group of people in the research process, thereby filling some of the power gaps between the researchers and the subjects. In this case, the studied people were active research participants rather than passive object of the research (Creswell, 2002). The author of this thesis represented both, the participant and researcher standpoints. In the context of this study, the learners in a classroom, the studied group, were actively involved in the research process giving them tasks that enabled to investicate their perception of the learning settings.

Figure 4 visualizes the course research design model and explains how the research process looked like. The research model began with identifying the course goals in general and planning the prototype, however, the design becomes a cyclical process of evaluating the situation and improving it accoding to the learners‘ needs. In the end of each run of the course, evaluation is conducted, learners assignments are analysed and the course will get some new elements. This model takes into consideration of the rapid changes on tool development and Internet culture, which influence must be focused at the learning tasks of the course.

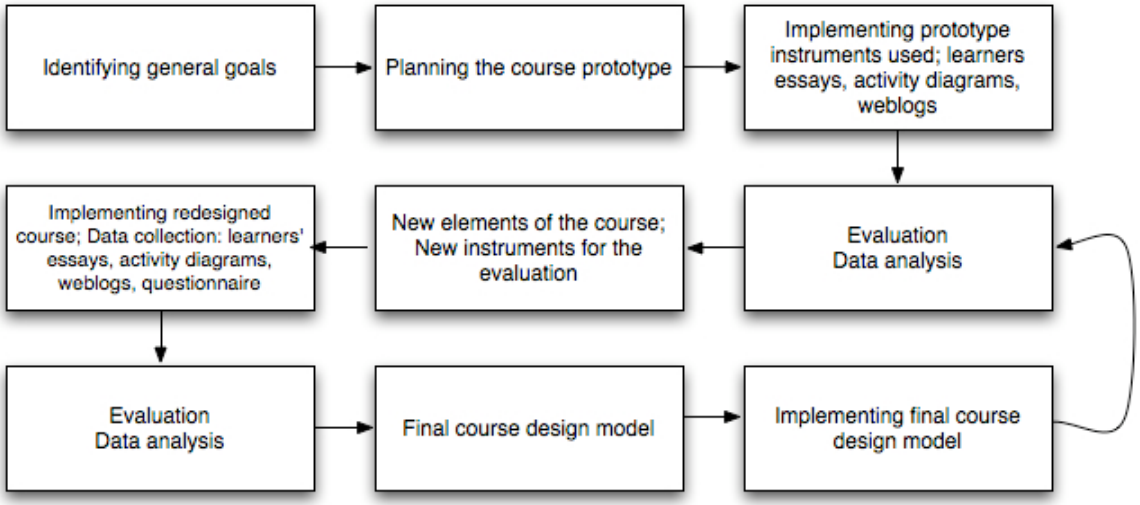

Figure 4. Course design model process

Several data collection instruments were developed. Schemas of PLEs and shared

distributed learning environments and activity diagrams collected from learners‘ blogs, essays from learners‘ blogs and a feedback questionnaire (see Annex 1) were used as research instruments in the design-based research process. In that kind of authentic settings it was important to use those data gathering instruments in order to get the exact ideas of learners‘ ideas and perceptions of learning affordances and self-directed learning. However, the same data-collection instruments served as a natural part of learners‘ assignments supporting their competence development. For planning the course, which would be learner-centred, it is recommended to take into consideration learners‘ ideas and understandings, what they express in their assignments.

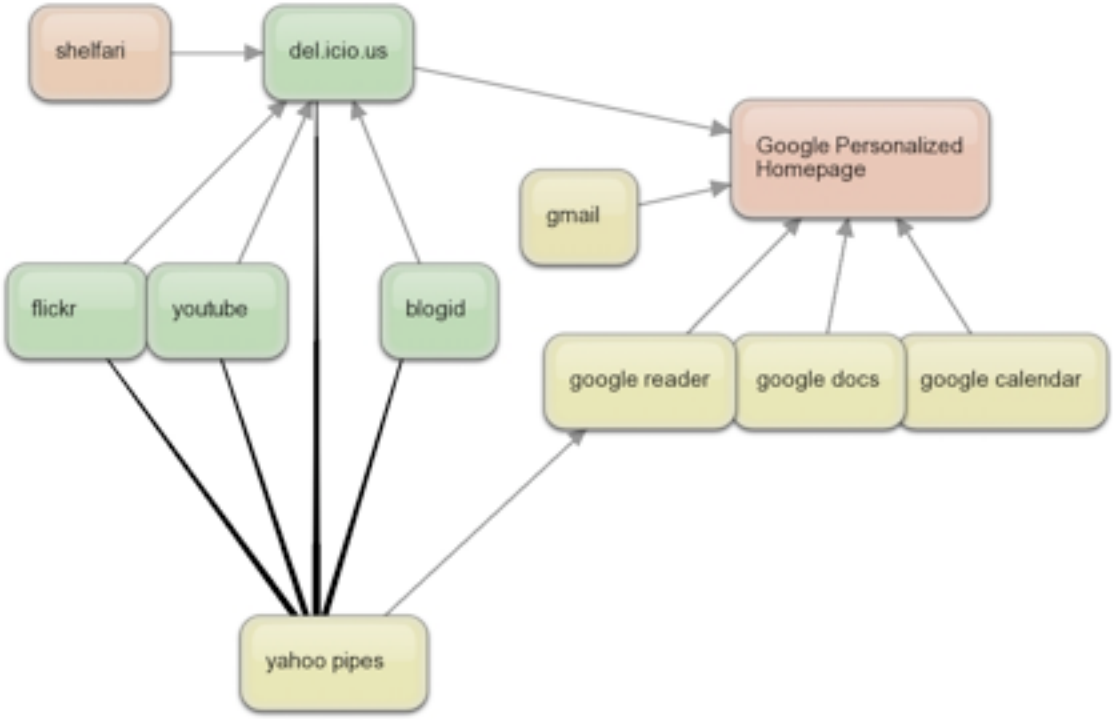

Figure 5. Student‘s scheme of distributed learning environment

Learners were expected to draw visual schemas of individual and collaborative learning environments and activity diagrams, write an essay, fill in questionnaire and keep the learning contract. Figure 5 demonstrates one example of the student‘s schema that was used in the analysis and where learner has visualised his distributed learning

environment. Usually the students also mentioned certain affordances in relation to the tools in their weblog posts. Each scheme was explained narratively at students' weblogs. This could be used to understand the relationships between the elements on the schemes. For the study, two researchers, the author of the thesis and one facilitator of the course, analysed what kind of tools were part of learners' distributed learning environment/what kind of tools they used for individual activities and what kind of tools for collaborative learning, also which learning affordances the students perceived in relation to every tool in their learning environment. Each affordance was listed only once in relation to certain tool. The differences between their catogorization were resolved after comparison and discussions. Next, second order categorization of affordances according to the activity types was undertaken. The list of nine pedagogical activity types was developed for this study: affordances related to self-tutoring, individual creative assignments, collaborative creative assignments, assessment and evaluation, learning environment assembling, community formation and grouping, lecturing and presenting, information filtering and regulation, monitoring and support. Such categorization enabled to count the frequency how often students perceived certain type of affordances per activity type. This data-collection and analysis method was useful to understand what the learners' perspective to the social software used as part of their distributed learning environments is (Väljataga, Pata & Tammets, under review). For the purpose of designing the course model, this data gathering method in authentic setting was useful, as it gets an overview, how the tasks related to one certain tool should be reconsidered, so that learners could also perceive other affordances related with that tool in general learning Web 2.0 culture.

Another learning task at the course was to write an essay. In the spring 2007 learners reflected and evaluated themselves, how did they implement their learning diagrams of self-directed learning in collaborative and individual learning environments. In fall 2008, learners were expected the write an essay on the same subject, but additionally to evaluate themselves according to learning contracts they had been keeping during the course; reflecting if and how did they accomplish their aims related to assignments and course. Essays were also used as an additional resource to get information about learners'

perception of affordances and self-directed learning. In their essays learners reflected about the affordances, which they had visualized in their diagrams and the concerns about self-directed learning related to the course.

One more task of learners had in fall 2007, was filling in the questionnaire. The questionnaire (see Annex 1) consisted of 13 open-ended questions. The questionnaire was developed for getting feedback from learners of the course structure and how did the course justify itself. Additionally, questionnaire contained questions, which were important for developing the course design, to get information about aspects that were not written in learners' weblogs and essays.

Questions 1-3 investigated students' opinions. Question 1 collected learners' expectations towards the course. Question 2 investigated were these expectations fulfilled. Question 3 examined, what were the difficult aspects of the course.

Questions nr 4, 5 and 7 investigated the tool usage. Question 4 was used to collect data of the social media tools and services students had used before entering the course. Question 5 asked what kind of tools students would keep using after the course, in their everyday practices. Question 7 asked students to list the social media tools that supported self-directed learning in their point of view.

Questions nr 6 and 11 collected data about students' understanding of the concepts. Question 6 investigated, how did the learners understand the self-directed learning and question 11 explored their impressions and views towards the concept of affordance.

Questions 8, 9, 10 and 12 investigated the issues of self-directed learning. Question 8 studied, what did the learners expect from facilitators in self-directed activities. Question 9 examinated, what were the pros and cons of self-directed learning in the point of view of learners, and how self was -directed learning implemented in group work. Learners were also asked to provide one example in question 10, how have they used self-directed

learning in their earlier learning process. Question 12 explored, how did the self-directed learning serve for collaborative activities.

From the point of view of developing the course design model, the answers of the questionnaire gave very thorough overview of learners‘ opinion of self-directed learning which helped to analyse the course’s self-directive aspects and make decisions how the course tasks should be changed. The answers about apsects of course structure were useful to designing more learner-centred structure and tasks for the course.

For analysing the answers of questionnaire and learners‘ sentences in essays, discourse analysis was used. The analysis of discourse emphasises how social reality is linguistically constructed and aims to gain a better understanding of social life and social interaction from our study of social text. The emphasis on a language as a constructivist tool is one of the core assumptions of discourse analysis and it is what makes discourse analysis more than just another method of using qualitative data. Discourses are identified through examination of texts (Breakwell et al, 2000). Value for using discourse analysis in this studies (see articles I-II) was to collect specific phrases what learners used to describe affordances as interrelation within activity settings. Learners‘ particular understanding of self-direction was necessary to identify how they conceptualized this during the course.

2.2 Research context

2.2.1 Sampling

The participants of the study (see articles I-II) were master students of Tallinn University, mainly from Institute of Informatics who participated in the course „Self-directed learning with social media“. The two groups of students were involved in the development of the course design in two separate studies. In the first study, held in spring 2007, 25 second-year master students participated at the course. In the fall 2007, 28 first year master students participated at the course. The master students of the Tallinn

University, Institute of Informatics originate from heterogeneous backgrounds. They typically consist of practicing schoolteachers of different subjects or informatics, educational technologists of different governmental and military institutions or private enterprisers. Thus, they all have needs for different competences and their contact with social media had been quite minimal so far. Due to the authentic settings of the study, convinious sampling was used. Thus the conclusions from this research must be regarded in the particular contextual setting.

Two facilitators of the course were the researchers and co-authors of the papers presented in this thesis. The facilitators developed the course structure, activities and learning materials for the course in spring 2007 and applied the changes suggested by the author of this thesis to the course at fall 2007. The facilitators provided support, gave theoretical and practical knowledge of different learning theories and methods, and modelled some of the competences of self-directed work and practices of using social media tools and services for personal and group use.

The author of this study was participant of the course in spring 2007 and served as a researcher in fall 2007. Participation a a learner offered a good opportunity to see the course through learner‘s eyes, integrating learner’s point of view provided important aspects to the new course design.

2.2.2 Settings

An overview of the general course structure in spring and fall 2007 is given in Articles I and II. The structure of the course was designed so that it would support self-directed learning in individual and collaborative activities. Together with facilitators, the distributed learning environment of the course was created, which was used and developed during the course. Everyone individually developed own personal distributed learning environments and in order to perform collaborative learning tasks, learners had to combine their learning environments, so that it would support collaborative activities.

Course had three face-to-face contact days, meantime learners were asked to do independent work, either individually or in groups. At contact days, facilitators gave theoretical lectures and modelled practical competences of using different social media tools and services for educational purposes. Same time learners were expected to get practical experiences with different social media tools in order to plan their individual and collaborative learning environments and activities with those tools. The course design elements and changes in the course design are presented in the Findings and Discussion part of this thesis.

Article II describes, how the distributed web-based learning environment of the course was conducted dynamically under learner's eyes with their active participation. Creating such joint learning environment together with learners, improved the learners competencies of self-directed learning, because they had chance to be members of one distributed learning environment from the beginning. They saw what was their role in it, and what was the co-learners' role and facilitators' role, and how each of the members could have contributed to the development of that distributed learning environment.

The central feedback and learning material service of the course was a blog at *Wordpress.com* provider, which was maintained by two facilitators. The primary function of the blog was organising learning materials and assignments, it also served as the feedback channel between learners and facilitators. The second part of web-based distributed learning course environment was the social bookmarking service *del.icio.us* (http://del.icio.us/mii7008), where facilitators collected bookmarks of the materials related to the course. The *Slideshare.net* tool and *Splashcast* were used to present slideshows, which were also embedded to learning materials at the course blog. The third central tool of the course was a shared aggregator in *Pageflakes.com* provider (http://www.pageflakes.com/kpata/12983138). This aggregator enabled to integrate different distributed course tools, using feed and mashup technologies. The course aggregator collected into the shared place the feeds from course weblog and learners'

weblogs enabling the monitoring between learners themselves and between facilitators and learners. (Väljataga, Pata & Tammets 2008). The tagcloud feed from the course bookmarks and the mashed feed from social bookmarks accounts were pulled to the aggregator.

The distributed learning environments of the students consisted of weblog, social bookmarking service and slideshare accounts, web-based office software, wiki, instant messaging services, and aggregators. Individual weblog was a compulsory tool for every student, also using *del.icio.us* for bookmarking was required. The rest of the tools were optional. Some students used very actively wiki, some web-based office service. That kind of usage of tools and services supported personalized mediation of self-directed learning. Every learner made the choice of most suitable tools for her/him. Learners had chance to decide what is useful for them and they used only those tools, but not the services, that teacher has thought might be the most suitable. The shared learning environments of the groups were developed as part of the course assignments. In general individual weblogs, collaborative writing/drawing environments like wiki, *google.docs* or *bubble.us*, instant messaging services were used, but the landscapes differed from each other. The case, where learners teamed up themselves, then selected tools what they need in order to complete assignments gave them compentencies, how to plan the group work, select the tools, which are suitable to everyone, how to organise the communication between team members and how to divide the responsibility. In other words, the assignment developed their competencies, which are required in their professional life.

3. Overview of publications

3.1 Article I

Terje Väljataga, Kai Pata, Kairit Tammets (under review). Considering learners‘ perspectives to personal learning environments in course design. Accepted to the book "Web 2.0-based E-Learning: Applying Social Informatics for Tertiary Teaching" by IGI Global.

Article I discusses the experimental course design, activities, assignments and tools that enabled to test the learner-centred approach of composing learning environments at the university settings as part of the master level course of „Self-directed learning with social media“ in Tallinn University. The main intention was to investigate how to take into account learners‘ perception of social media tools, while evaluating and designing the course.

Article I discusses the experimental course design, activities and tools that enabled to test the learner-centred approach of composing learning environments and assignments at the university settings as part of the master level course of Educational Technology in Tallinn University.

The results demonstrated that initially it was difficult for the users to understand and visualize the elements of their personal learning environments. Many learners placed themselves central to the static model, which simply clustered their tools under different types. They faced difficulties in comprehending the distributed learning environments as landscapes of tools and services, where the centre of the environment changes from the moment to moment according to the use of particular action. This understanding changed during the course, the students started to understand the information and content flows between tools and services and could visualise such landscapes of social media. Learning affordances, collected from personal and shared social media landscape schemes and the

narrative descriptions in blogs, were categorised into nine activity types, which were developed in this particular research. Article I demonstrated the perceived affordances of every learner with respect to the activities they wanted to perform and tools they selected and used. It was important to analyse those affordances in order to study how to change the design of the course in a way it takes into account learners‘ perception of the environment.

The contribution of the author of this thesis to the article was analysing the learning affordances of learners described in activity diagrams, to cluster them to the categories and to present a conclusion what were the main learning affordances of social media tools perceived by learners.

3.2 Article II

Tammets, K., Väljataga, T. & Pata, K (accepted). Self-directing at social spaces: conceptual framework for course design. In the proceedings of ED-MEDIA 2008 - World Conference on Educational Multimedia, Hypermedia & Telecommunications. Vienna, Austria, June 30-July 4, 2008.

The main goal of the article II (based on data analysed on autumn 2007) was to elaborate the conceptual framework for course design that aims at developing the competences of self-directing learning related activities in new web-based social spaces. Article introduces the course design principles and the results of the evaluation of the course. The 28 participants of the course were first year master students of the department of Informatics in Tallinn University. Learning environment of the course was a distributed social media environment, which supported the self-directed learning. For evaluation, mainly feedback questionnaire and partly the essays from learners‘ weblogs were used.

The main results indicated the changes in learners‘ habits of using social media. Very few learners had used blogs, bookmarking service *del.icio.us* or collaborative learning/writing

environments like wiki or *google.docs* before they entered to the master studies. It appeared that after the course, many learners decided to use certain social media tools in their learning process continually. It was found that after the course, the learners perceived that the social media tools, which they could try out, supported them self-directed learning. Learners found the self-directed learning mostly a useful method for learning, but they still admitted that it requires a motivation and self-control. The students suggested that the course in social media environment, which supports self-directed learning competences, should be compulsory for all the first year master-level students, since it gives them good opportunity to plan studies, select the tools and services and to develop learning environment, which supports their learning process, but also aids their professional development and social networking competences.

The contribution of the author of this thesis to the article was developing the questionnaire, also analysing the answers in questionnaires and essays of learners. Course elements, like learning contract for the support of self-directed learning and for self-evaluation and some innovative elements compared the spring 2007 course (more collaborative tasks, peer-reviewing, modern technological solutions) were suggestionsted by the thesis author.

4. Findings and Discussion

The intention of this master thesis was to develop the course design model, which supports self-directed learning in distributed learning environment, considering the learners‘ perception of the learning affordances of social media tools and learning environment, but also their perception of the self-directed learning with social media in the instructional design process and course design. The answers to the research questions of this thesis were synthesized from two separate studies of the course „Self-directed learning in social media environments“ held in spring and fall 2007. These results were generalised to present the cyclical evaluation process, which led to the development of the course model.

In the framework of this thesis, master level course „Self-directed learning with social media tools“ was conducted and evaluated twice. The first course, held in spring 2007 served as the pilot study, because the courses where competences of using distributed social media tools were introduced, were never taught in Tallinn University. In Article I the pilot course was evaluated from the perspective of learners‘ perception of learning affordances of social media tools and their understanding of self-directed learning in social media environments. Using the data from Article I, several changes were suggested to course, which mainly were related to the involvement of additional self-directed learning support elements and assignments to the course activities. The course was run second time in fall 2007. This course was evaluated from the self-directed learning perspective in Article II. Using the evaluation data from both courses, the final course model was developed and will be tested in fall 2008.

It is important to look the results of article I and article II together. Although study I focuses mainly on the results related to learning affordances of social media environments and the second study more to the self-directed learning competences with social media tools, together they highlight important aspects that need to be considered as part of the course design model for developing social media competences with social media tools. Article II describes learners‘ opinion of what kind of tools support self-

directed learning, what is the role of facilitator in self-directive course, what activities are self-directed in the point of view of learners, the pros and cons of course, which supports self-directed learning in distributed learning environment. Article I focuses on the changes of social media tool-usage habits, and learners‘ perception of what kind of social media tools might be supportive for individual assignments, group activities, creating the group, presenting and lecturing, assembling the learning environment, filtering the information, self-tutoring, assessment and evaluation, monitoring and support. Taking into consideration data from both studies, the developers can plan the activities and tools for the course that would support self-directed learning in distributed learning environments.

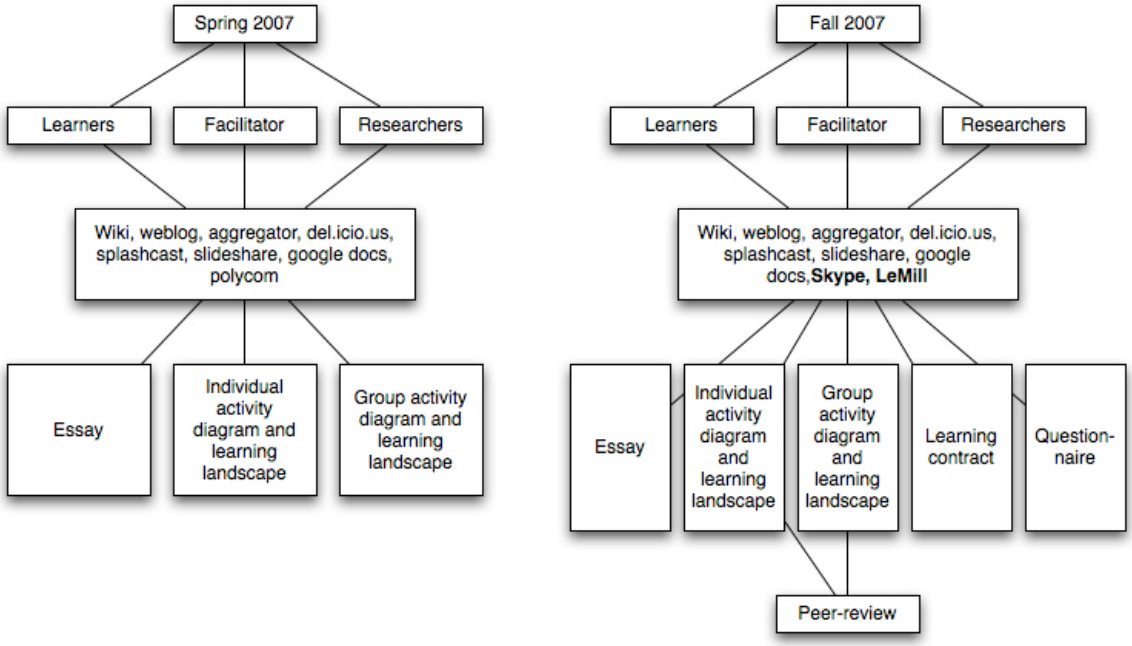

Figure 6. Course elements in spring 2007 and fall 2007

Figure 6 describes the course elements and their changes in spring and fall 2007. Several changes were made as the result of analysis of learners‘ assignments. In order to develop the interaction between learners, commenting and conversation in learners‘ weblogs was emphasised in fall 2007. Innovative element, compared with the course held in spring 2007 was the activity to add comments to the person’s weblog, while she or he was

presenting the assignment in front of the class. It was supposed to give the learners the better idea of interaction, but also to improve the critical peer-reflection. The evaluation of the data from spring 2007 proved that collaborative activities in web-based office software were popular, but causing some difficults among learners; second run focused more on introducing those software and practical collaborative activities in these systems.

Another difference between the two courses run in spring and fall 2007, was selection of social media tools. The central tools like weblog, aggregator, social bookmarking service *del.icio.us*, and *slideshare.net* remained the same. Some tools were replaced, for example, the previous generation video conferencing system Polycom was replaced with Skype, which is more accessible to learners than Polycom is, also repository to collaboratively create learning resources LeMill was introduced in activities.

From the self-directed point of view, the most important decision was to take into use conversational learning contracts, where learners planned their learning process and evaluation criteria and afterwards reflected how succesful they were in their activities.

The following findings in studies I and II provide answers to the research questions.

How do learners evaluate the course in distributed learning environment from the perspective of gaining self-directed learning competences?

In spring 2007, the course was held as a compulsory course for the second year master level students of the teachers of informatics and designers of multimedia environments curriculum. The initial plan was to develop the course for developing learners‘ competences of using distributed social media for developing individual and group learning environments. The course activities taught how to use social media environments and developed competences how to plan individual and collaborative learning activities at such environments. However, the course facilitators believed that such environments might be useful for self-directed learning.

The results of study I indicated that learners would have needed this course at the beginning of their master studies, not in the end of the second year. Learners found that it would have been useful for them to develop their own distributed learning environments as soon as they entered to the master studies, so that they could have used them during their studies. They also found that the course taught them to plan their studies, tools and learning process as a whole, also made learners more think of their assignments and therefore learners suggested that it would have been better to get these competencies in the beginning of master studies.

Learners pointed out, that learning in distributed learning environment in self-directed way requires a lot of motivation and sometimes it might be difficult to push yourself and force to learn. On the other hand, learners were aware that everything changes so fast in technology, society and education, that in order to follow it all, they need to become more self-directed learners.

Which learning affordances do learners perceive at the distributed learning environments during the course?

The learning affordances that learners perceived related to social media tools were helpful for developers to make changes in the course design. In the beginning of the course development, the instructors of the course had only vague expectations for what purpose the learners could use weblog, wiki, social bookmarking service or aggregator for individual and collaborative activities. Thus, it was difficult to develop more precise learning activities and study materials. After analysing the learning affordances of social media tools from diagrams and essays, it became clear that learners had their own limited perception how to use tools. The most interesting discoveries were related to the affordances of weblog. Learners did not see the weblog as a collaborative and community tool, as it was expected, but more as the tool for individual assignments. For collaborative activities they used wiki or web-based office software. Learners claimed that the blog was the most supportive tool for self-directed learning, but their perceptions of the learning affordances of the blog demonstrated that they imagined using blogs mainly for

individual activities. It indicates that the course activities with the blog have been too individual and more activities with the blogs, where collaborative and community aspects of self-directed learning were highlighted, could be integrated.

Another interesting finding was related with social bookmarking service *del.icio.us*, which was compulsory tool for learners in course. They mostly perceived the learning affordances related with information filtering, which is the main functionality of *del.icio.us*, but almost none of them distinguished the community aspect behind the bookmarking service. *Del.icio.us* allows users to recommend the bookmarks to each other, to see, what other users have saved with the tags related to user‘s special interest area, to use group tags and so on. Although all the learners used the course tag with group tagging purpose, obviously they could not perceive the community side.

The central tool of the course, aggregator was the one, that every learner was not supposed to have as its own, but they all saw, how the course aggregator was mashed together and what was its role during the course. Probably perceiving that by using this tools, facilitators and co-earners had chance to observe all the updates of the learners‘ weblogs in same place, the most mentioned affordances were related to the category monitoring and support.

How can the students‘ perception of the learning affordances of the environment and self-directed learning during the course activities be considered as part of the course design?

Learners‘ perception of the learning environment and different tools can be considered while developing a new course design. Facilitators give learners tasks and selection of tools and services with purpose. But their perception towards learning affordances of certain tools can be different compared to learners‘ perceptions, which makes the choice of the right medium and environment for someone else quite difficult, as Article I describes. Facilitator cannot predefine, but only predict the affordances of learning environement or tools, which means that learning environment cannot be ready when

learning begins, but has to evolve in the learning process.

Facilitators and developers expect that learners will use one certain set of tools for collaborative assignments, but evaluation proved that learners chose various tools for these activities. It does not indicate that facilitators‘ choice was not good for collaborative assignments, but rather learners have different collaborative learning hanbits and tool preferences emerge from those jointly grounded habits. It means that developers of the course should give tasks, which are related to group assignments, but also give a lot of freedom encouraging learners to test different tools to find what is most suitable for them in team settings. Since learners underestimated the role of blogs as collaborative tools, next course task should try to introduce some collaborative activities with blog to increase their perception of blogs as collaboration tools as well. These are some examples, how learner's perception of tools can be considered while designing a course. Developers might see the course differently than learners, they might plan activities with one certain tool and tasks related to other tools, but learners, who actually are using tools for performing activities, might see them quite differently.

What the important aspects and bottlenecks of implementing the course design in distributed learning environment at master level studies at Tallinn University are?
Competence and preparedness of facilitator of the course. The facilitator should be ready to run the course in distributed learning environment, which means that administrating is more complicated – institutional closed learning management systems provide administration support, but in distributed learning environment this issue must be solved by facilitator in the way it is best for her/him. Another aspect which might be inconvenient for facilitator, is the situation when learner uses the same weblog at different courses (that is what they usually do). There also some solutions, like tags and categories in weblog to separate the content of different courses, but if facilitator is technically incompetent, it is unpleasant issue to find the assignments and blogposts which are related to several courses. On the other hand it gives facilitator broader understanding of the whole development of the student and if technical aspects of

separating the content were resolved, it makes the assignments and feedback even more learner-centred. Also learners expect conversation and interactive communication between facilitator and learner. While developing the course like that, it is vital to think beforehand if facilitators are ready to monitor learners‘ learning process and development constantly every day and provide feedback to them or the students will get feedback only in the end of each week. However, as soon as the feedback is provided more seldom, then less-motivated learners might lose interest.

Learners‘ technical weakness - it is complicated to run the course, when the levels of the technological skills of learners’ are varying from the beginning level to advanced level. In the context of this study and thesis, the learners were all from the department of Informatics, but still some of them were quite weak using the technology.

Readiness to be self-directive learner. Not all the learners are ready to motivate themselves all the time, they might feel themselves lonely in distributed learning environment and if the feedback comes also seldom, they can’t see the positive aspects of the course like this. They don’t know how to plan their studies and what tools might be best for them. They can’t understand why it is important reflect in public space or why they should be part of some social networks. It is common that at every course have some learners are like that, but still it is quite important issue to be considered.

Until the social media and distributed learning environments are quite seldom used in learning process, developers of the course might battle against overall attitude, orientation and understanding of self-direction, openness of learning and distributed learning environment.

What the important components of course design for teaching self-directed learning competences at master level are?

On figure 7, the course design model, which supports self-directed learning in distributed learning environment, has been visualized. Important components of that kind of course design model are: learner-centred approach, distributed learning environment, scaffolding, clear goals of the course and authentic learning tasks.

Learner-centred approach. Nature of the learner should be more considered – some learners need more scaffolding, some less. Some of them are more active in collaborative assignments, other feel themselves better in individual activities. Learners are heterogeneous and need more individual approach to facilitate their learning. The role of teacher has changed to more facilitator, who provides support (technically and pedagogically), but who does not say what tools should be selected or in which environment the learning should be taking place.

Distributed learning environment. Learner should be able to enter to the course with his/her own tools and integrate them with the rest of the learning environment. Instead of using closed institutional learning management system as learning environment, varying social media tools and services could be used for supporting individual and group activities. The facilitator could offer the selection of different technical solutions and to provide support with technical services, but learners should do the final choice. Web 2.0 social media tools and services support more self-directed learning and life-long learning than closed learning management system. It is vital that after graduating studies, learning materials, resources, reflections and assignments will not be deleted in system, but they will be staying with learner.

Scaffolding. Giving learners feedback providing scaffolding in order to guarantee interaction between learners and facilitators is an important aspect. Studying in web-based course and in distributed learning environment requires more motivation from learner and this study (see articles I-II) demonstrated that learners felt more motivated when they received feedback and guidance in their weblogs from facilitators and co-learners. One of the advantage of Web 2.0 and social media tools and services is the networking and social side, which should be exploited in learning activities.

Clear goals of the course. When learning takes place in distributed learning environment and mostly is web-based, then the course should have clear goals, tasks and outcomes. Learners need to motivate themselves anyway more than other learners who are participating in the traditionally structured course with the teacher who says what to do with which tools, hence the goals and objectives of course like this should be very clear

for learners.

Authentic learning tasks – tasks should involve activity-based real-world actions and students would be expected to construct their own responses, and tasks should replicate challences faced in real world. For example surveys, essays, presentations, group reports.

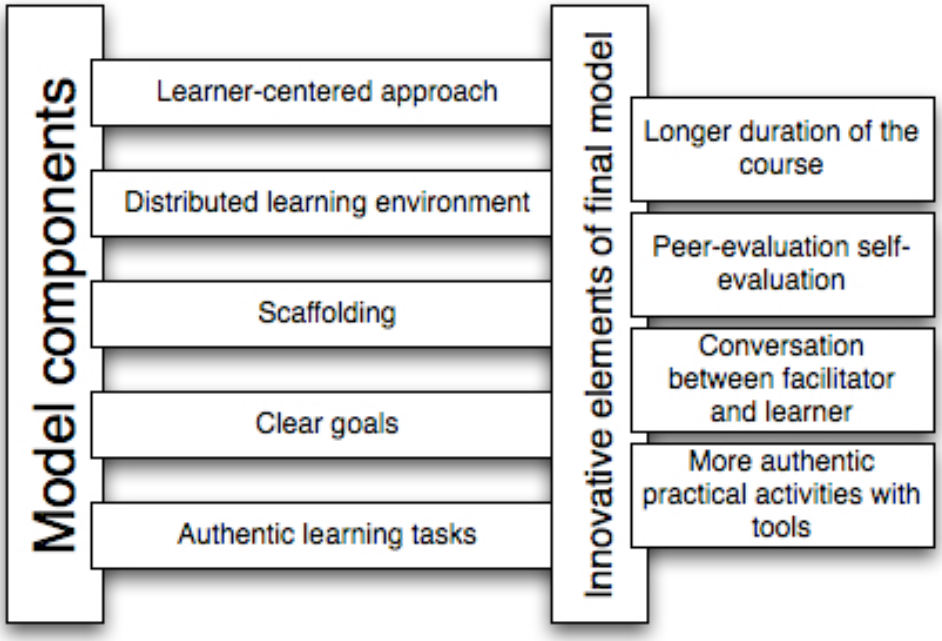

Figure 7. Course model, which supports self-directed learning, with innovative elements

Elements of the final course design model

In addition to the above mentioned course design components, there are some innovative elements, which should be considered while planning another course in fall 2008 and which can be derived from the results of final analysis.

Activities of the course have been so far lectures, practical activities with the course tools, individual activities and collaborative work, learners‘ presentations and evaluation by the facilitators. From the point of view of self-directed learning, it would be useful to push the learners more into the activities like peer-evaluation and self-evaluation. Although learners were expected to comment other learners presentations, there should be more activities related with peer-evaluation. The learning learning contracts, which

were used in fall 2007 justified itsself, but the self-evaluation aspect should be strenghtened even more in order to support self-directive learning. By virtue of that it would be useful, if course duration was longer, that would encourage learners to keep learning contracts for longer time performing constant self-reflections in weblog, so that it would become a habit.

Related to focusing more on learning contract, the conversation element should be used more, both between facilitator and co-learners, whether in web-based format by commenting in weblog or in face to face. Facilitators would be expected to start the conversation about learner's learning contract during the whole course, in order to develop the learner's compentences of self-directing and –evaluation.

The practical activities related to social media tools should be more authentic than they have been so far. The course has concentrated of giving overview of as many tools as possible, but sometimes it might be shallow and learner might not get experience how to use all the important functions of the tool. It should be more than just „lets make an account" and „lets try to do this and that". The number of tools can be smaller and with every practicial activity with certain tool, there should be a meaningful task that was related with individual or collaborative assignments.

Futher suggestions

There is no reason to doubt, that course „Self-directed learning with social media" was successful in Tallinn University. Basically all the participants were pleased with the course, it seemed to them very innovative and useful and they found that all at least some master level courses should be designed like this. But it is important to take into consideration that they might have felt it just because of the fact that it was different, that old is bad and new is good. They have experienced one course, where they were given more freedom, but would they be so enthusiastic also if all the courses would be designed like that? One argument supporting the successfulness of the course from learners perspective is the following: most of the learners, who are also teachers ar schools, were

really excited of the social media and they started to design similar courses for their students. But still it is something to think about, is it that old things are bad and new things are good?

The context of this study was learners‘ from the department of informatics, who have been in touch with technology quite often. But it is worth considering, what would happen if to implement course structured like that with humanitarians, like students of philology? Are they ready to use technology in their learning process in such quantities? It can be assumed that today’s young people generation is able to use computers and they are aware of social software tools and services, but probably it would be an interesting idea to offer the course in distributed learning environment for all the learners at the university.

This study focused more on learners, how did they perceive learning affordances, how did they managed planning their studies in distributed learning environment, what were the aspects of course supporting self-directive learning, what were the difficult aspects of the course in their opinion and so on. The learners‘ perspective of the course became quite clear, a lot of information was gathered how to design the course, so it would be even better for learnera. But what about facilitators? At the moment it is a bit complicated to find facilitators, who could be ready to give up using institutional learning management system and move over to distributed learning management, which does not provide any administration. Additionally, most of the teachers‘ technical preparedness is not enough to run courses in such environment. Solutions can be training courses for teachers, how to design course in Web 2.0 environment with social media tools. But also former learners from the course, who are also teachers, can spread the message, skills and compentencies.

Conclusion

This master thesis focused on developing a new course design model, which would support self-directed learning in distributed learning environment. With the arrival of Web 2.0 and development of social software, learning is moving out from the classroom and it requires learners to become more self-directed learners.

The aim of the thesis was to:

- To develop the initial course design model for enhancing students‘ self-directed learning competences at distributed learning environment;
- To formatively evaluate the application of the course design model at Tallinn University through cyclical design-based research
- To formalize the final course model for teaching self-directed learning competences in distributed learning environments

The following research questions were formulated:

- What the important components of course design for teaching self-directed learning competences at master level are?
- How do learners evaluate the course in distributed learning environment from the perspective of gaining self-directed learning competences?
- Which learning affordances do learners perceive at the distributed learning environments during the course?
- How can the students‘ perception of the learning affordances of the environment and self-directed learning during the course activities be considered as part of the course design?
- What the important aspects and bottlenecks of implementing the course design in distributed learning environment at master level studies at Tallinn University are?

The design-based research and participatory research were used as methods for conducting this study.

The main results indicated the elements of course design model, which supports self-directed learning in distributed learning environment are: learner-centred approach, distributed learning environment, scaffolding, clear goals of the course and authentic learning tasks.

Course design model will be implemented in fall 2008 for the third time. It would be worth considering, how to use the course with such structure with the students from humanaristic backgrounds instead of students from the department of Informatics. Also, further studies should focus, how to give the compencencies to the teachers how to teach in distributed learning environment so that it would better support self-directed learning.

Kokkuvõte

Käesolev magistritöö keskendub uue kursuse disaini loomisele, mis toetaks enesejuhitavat õppimist hajutatud õpimaastikul.

Magistritöö eesmärkideks seati:

- välja arendada kursuse esialgne mudel, et arendada õppijates enesejuhitava õppimise oskuseid hajutatud struktuuriga õpikeskkonnas;
- formatiivselt viia läbi kursuse mudeli hindamine, kasutades tsüklilist disaini-põhist uurimismeetodit (design-based research);
- välja töötada kursuse lõplik mudel, mis toetaks enesejuhitava õppimise oskuste õpetamist hajutatud struktuuriga õpikeskkonnas.

Magistritöö uurimisküsimused on:

- Mis on olulised enesejuhitavat õppimist ja selle õpetamist toetava kursuse disaini komponedid?
- Kuidas hindavad õppijad kursust hajutatud õpimaastikul ennastjuhtivate oskuste arendamise ja omandamise seisukohalt?
- Milliseid lubavusi tajuvad õpilased hajutatud struktuuriga õpikeskkonnas?
- Kuidas saab kursuse disaini protsessis arvesse võtta lubavusi, mida õpilased tajuvad õpikeskkonna ja enesejuhitava õppimise kohapealt?
- Milliseid kitsaskohti tuleks arvesse võtta rakendades Tallinna Ülikoolis hajutatud õpikeskonnas toimuvat kursust?

Magistritöö on 56 lehekülge pikk, sisaldab 7 joonist ning ühte lisa. Kasutatud on 29 kirjanduslikku viidet. Töö on kirjutatud inglise keeles. Kaasas on kaks inglise keelset originaal artiklit, milles käesoleva magistritöö autor oli kaasautor.

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ANNEX 1
QUESTIONNAIRE

1. Millised olid Sinu ootused kursusele tulles?

……

……

2. Kuidas ootused kursusele end õigustasid?

……

……

……

3. Millised nüansid kursuse ülesehituses valmistasid raskusi? (Näiteks palju uusi vahendeid, õppejõu ja õpilase vahelise rolli muutumine, varasemast erinev õpptöö keskkond? Muu?)

……

……

4. Milliseid alljärgnevaid web2.0 tööriistade gruppe olid kasutanud enne kursusel osalemist? Kirjuta grupi taha tööriista nimed.
   - E-posti teenuse pakkujad
   - Sotsiaalsed järjehoidjad
   - Blogid
   - Üheskirjutamine
   - Agregaatorid
   - Veebipõhine kontoritarkvara
   - Videote ja fotode repositooriumid
   - …
5. Milliseid web2.0 tööriistu jääd sa kindlasti oma õpitegevuses ka edaspidi kasutama?

……

……

6. Mis on sinu jaoks enesejuhitav õppimine?

……

……

7. Millised web2.0 tööriistad toetavad sinu enesejuhitav õppimist?

……

……

8. Millised olid sinu ootused õppejõu tegevusele enesejuhitavas õppimises?

……

……

9. Millised on enesejuhitava õppimise plussid ja miinused?

……

……

……

10. Too üks näide, kuidas sa rakendasid varem oma õpitegevuses enesejuhitavat õppimist.

……

……

11. Kuidas oled Sina aru saanud mõistest „lubavus“?

……

……

12. Kuidas toimis Sinu jaoks enesejuhitav õppimine loovas ühisõppes?

……

……

13. Selgita õpilepingu olulisust/mitteolulisust sinu enesejuhitava õppimise protsessis.

……

……

ANNEX 2

ARTICLE 1

Considering learners‘ perspectives to personal learning environments in course design

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Outline of the chapter:

Introduction

The landscape of tools and systems so far used for educational purposes is continuously complemented with the new generation of open-source and open-access social software tools, services and their enhancements. The notion of social software refers to the applications, which support social information retrieval, personalized aggregation and monitoring, as well as easy and joint publishing, sharing and interaction. Despite the fact that new emerging technology is not designed specifically for the use in education, learners are embracing social software outside of the formal educational setting. Social software offers somewhat alternative or additional solutions supplementing or partially replacing the shortcomings and barriers of institutionalised closed and static systems. The advantages of social software are mainly seen in openness and free accessibility of web content, connection building and networks within common interests (MacManus & Porter, 2005). These are the primary reasons in addition to the growing use in every day life, why researchers and educators have started to find ways how to benefit from and implement new generation of tools and services in the field of education.

Democratic and user-friendly technology brings along the necessity to rethink the pedagogy and current learning and teaching models. Social software tools are providing

and shaping the cultural tools serving as "carriers" of socio-cultural patterns and knowledge (e.g. Wertsch, 1994). Furthermore, Zimmerman (2000) has suggested that e-learning with social software tools and services can be seen as a promising possibility to establish a new learning and teaching culture, which targets coping with changing environments and requirements in the context of learning. Thus, we are facing the situation, where the use of new software in educational settings simultaneously creates conditions on the one hand, and on the other hand demands to rethink the pedagogical approaches.

For instance, there has been a debate going on concerning the choice of the right medium for learning activities (Ehrmann, 1995). Part of this debate is questioning, who should select the learning environment for learners. Institutionalized learning environments, that are currently in use, are structured mainly around the content. These systems are driven by the need for institutional management of courses with standard structure for all learners, rather than favoring individualized approach, where learner's interests, tools' preferences and objectives were put in the centre. Only predefined set of activity patterns, dictated by the particular application, is possible in many institutional systems. The facilitator authoritively defines the learning objectives, tasks to be carried out, medium to be used as well as expected outcomes. So far these environments are centrally administrated and the facilitator has limited possibilities to adaptively meet learner's tool preferences for supporting their personal learning aims. Thus, the differences between learners in terms of prior knowledge and experiences but also their expectations are left aside. However, learners' expectations towards the learning situation and environment determine their perception of what the environment enables them to do, and are consequently influencing their learning activities within this environment (Könings, et al., 2006; Entwistle & Tait, 1990).

The application of new social software tools in education suggests the learner-driven bottom-up approach, where learners, instead of facilitators, are challenged to make a choice of their technology for mediating their activities. The positive side of it is that it enables learners to form an environment, which suits best to their expectations. Thus, this approach also gives an opportunity to create authentic situations, where learners are not only responsible for their tasks, but also for the tools and systems they use for mediating these tasks. This means taking control of their activities and the environment where the activities are carried out. Developing such a set of dispositions meets the needs of the post-industrial society where each person needs to maintain their own life-long learning and knowledge building activities also without the access to institutional learning management systems. Learner-defined distributed social learning environments challenge the previous centrally determined course design models and implies of various social tools that the students might prefer for conducting assignments.

This chapter discusses the experimental course design, activities and tools that enabled to test the learner-centered approach of composing learning environments and assignments at the university settings as part of the master level course of Educational Technology in Tallinn University. The focus of analysis is on the conceptual change university students

needed to undergo when attempting to form personalized distributed environments from social software tools when realizing their objectives in formal or informal learning settings or at work environment. It is demonstrated, how students perceive the learning affordances of common social software tools while building their personal learning environments. The main course design aspects, originating from this learner-centered perception of social software, are outlined.

Learning in personal distributed social software environments

New view to the learner-centered learning environment and activity design is built on three major areas:
- Social software with feed and mashup technologies, tags, networking and social browsing features suggests distributed, rather than concentrated approach on one's personal learning tools.
- The ecological view to the learning environments assumes that learners with different objectives would perceive different affordances, while using these social tools.
- The visualization of personal and collaborative learning environments, activity diagrams in these and the affordances enable to change learner's conceptual understanding of new distributed and social environments.

Distributed learning environments
The notion of distributed learning environment refers to the open, personalized environment of loosely coupled social software applications and web-services. The building blocks of distributed environments are various web-based tools and services as well as human resources, and all the accessible knowledge artifacts. Distributed environment permits information distribution and content flows between chosen tools and services. Distributed learning environment does not refer only to an attempt to bring together geographically and temporarily distributed learners and facilitators. Rather, it signifies personally managed landscape of tools and services, people and artifacts. The aggregation of feeds, mashup of content flows and information retrieval by tags connect various building blocks and enable to dynamically filter users, their meaning perspectives and the knowledge they create.

Learning is the process of continual changes, which requires learners to adapt to emerging situations. Current social software offers a new level of openness, flexibility, and customization possibilities. Thus, distributed learning environments can be dynamically and continuously changing in terms of components, structure and application. They become more adjusted to the learners needs and preferences who is using them for certain activities. The components of an environment can be easily replaced or complemented with the additional building blocks or reduced by segregating some of them, which do not serve the purpose anymore. Thus, tools with adjustable, changeable and co-evolving functionalities are prerequisite components of the distributed environment. Combining and recombining various applications offers quite powerful ways of managing, repurposing and remixing information, herewith supporting various regulative, coordinating and executive processes in knowledge building. Every

distributed personal environment is different, depending on the person's preferences and expectations, his/her process of personal development and mental processing. Giving the freedom to select and combine appropriate tools for supporting and managing activities, challenges learners not only to deal with the content or the problem but also the context around it. The personal choice of tools can be interpreted as a manifestation of the learning process itself (Dalsgaard, 2006).

Planning one's distributed personal learning environment requires to get an overview of information flows between the different tools. So far most of the learners have had no need and experiences of selecting and planning their tools. This pampered situation at the universities needs to be changed. Learners require training of how to individually or in groups cope with dynamically changing environments they meet at every step of their life-long learning. Mapping the learning environment and its different tools in the context of personal activities presumes that learners are aware of the supportive and hindering aspects of the tools.

Learning affordances

To analyze how learners in a given virtual environment perceive themselves, the artifacts and tools, and other learners, it is useful to emphasize the affordance concept. Gibson (1979) originally defined affordances as opportunities for action for an observer, provided by an environment. The mainstream view on affordances in educational technology settings considers them as objective properties of the tools or functionalities provided by the developers of the tools, which can be perceived and put into function in the context of certain activities. Thus, it is commonly suggested that tools have concrete technological affordances for certain performances that could be brought into a learner's perception with specific instructions (Norman, 1988; Gaver, 1996). This use of the concept tends to ignore its relativistic nature and actor-dependence, and seems to imply that affordances should be located in the environment or specific artifacts or tools interdependent of the users.

Contrary to this positivist understanding of affordances as stable part of the learning environment only, the ecological view takes into account: a) persons with certain objectives, b) their continuous interaction with each other, c) objects and tools in the environment, and d) oral/written narratives and visual items different people have left into the environment to continuously mediate their actions. The affordances as potential for actions are evoked and changed dynamically in the interplay of learner's objectives, the activation of previously experienced emotions and performed activities, the internal pre-selection of anticipated affordances for actions, and the simultaneous coupling with the affordances that they can perceive in the environment.

From the learner‘s perspective, using and creating tools and knowledge artifacts is no more than actualizing certain dimensions, the affordances of the environment that mediate the fullfilment of their aims. When triggering some affordances, learners also store these dimensions of the environment as embodied sensory-motor paths of neural activation for the further use. Any social software tool or weblog posting can trigger

some actions only if the learner with certain objectives anticipates certain affordances to be present there, which is dependent on the learner's earlier experiences with similar mediators of action. Thus, it cannot be expected that the tools and knowledge artifacts developed by other people, would necessarily evoke same affordances as they did for the developers of these mediating devices. From the external observer's viewpoint, who has certain cultural background, the continuous actualization of certain dimensions around them for certain performances becomes evident as part of activity patterns. Such dimensions of the environment that perceptually become related with certain activity patterns people observe and can identify, can be considered in this culture the tools offering certain affordances for the members of that culture.

The affordances that enable actions for one particular learner in a certain learning environment are not limited to the action potentials one can evoke interacting with the objects around them. The affordances are influenced of how the objects are interrelated and influence each other. The affordances of the environment for a certain learner are also dependent on the co-learners and their different perception of the affordances. Affordances depend also on the cultural constraints in which learners interact with each other, and with the objects of the environment. Other learners, their selection of affordances when developing their tools to perform actions, would serve as constraints or triggers, limiting or broadening the possible affordances that can be evoked in the environment. For example, the affordances of benefiting from social recommending functions of social bookmarking tools would be fully actualized only if a group of associates uses the same environment contributing to each other's bookmarks. Any RSS feed will obtain the affordance of information channel if there is another distributed tool (eg. aggregator) where information flow is received and monitored. The actualization of the affordance of social filtering and mashing information with tags and feeds is dependent on the collective actions of writing and tagging blog postings.

While interacting with each other, with knowledge artifacts or tools, learners continuously interpret the situation, and construct or re-construct meanings. Thus, instead of relating affordances objectively with software applications or other complex tools and artefacts, they should rather be related to the Activity System (Engeström, 1987), where learners perform joint actions with artifacts and tools in order to accomplish their individual or shared objectives. Affordances emerge and potentially become observable in actions what people undertake to realize individual or shared objectives.

There exist several constraints, which would restrict the application of all possible actions in the Activity System. The constraints related with learners arise when they have to decide, which actions must be undertaken to fulfill their individual or shared objectives. This brings along the development of certain rules how to act in order to be effective in the certain environmental settings. Learners who work on shared objectives would also need to decide the distribution of labor, their roles in actions – all this presumes that they perceive their co-learners adequately. The constraints would also arise from the objectives predetermined by the task setting, either it was established by learners themselves or by the instructor in this activity, and whether the task was accompanied by

certain artifacts to guide and contextualize the learning process. The constraints of activities in the Activity System would also be related with the learning medium, with using the tools, which have some technical functions, and with the artifacts conveying meanings in specific domain context. The aforementioned groups of constraints suggest that the learning affordances of Activity Systems might consist of interpersonal-, task-related and learning medium affordances.

Affordances can be written down by using the set of rules: each affordance consists of the action verb, which may be specified by semantic pedagogical taxonomies (e.g. scaffolding, inquiry, reasoning or other taxonomies) and perceptional dimensions (visual, audio, time-related e.g. synchronous). Besides action verbs, the affordance description may consist of the subject (e.g. learner, community, group) and artifact (e.g. webpage, document, image, model) nouns or both, and their properties (e.g. groupleader, facilitator, shared, interactive). Examples of learning affordances are: *synchronous audio-connect of distributed group of learners; reorganize shared artifact; record community chat-scroll.* Similarly to the folksonomical user defined keywords (tags) for marking and filtering information, which have become one of the basic characteristics of social software, such user defined affordances as action potentialities may serve as important social filters determining, which activities would social software tools mediate the most.

Structure of activity

An important part of planning learning in personal distributed environment is determining learning activities, resources, tools and events. The Activity Theory model has recently been of continuous interest in explaining the processes taking place in the online learning communities. According to Leontjev (1975/78) and Kuuti (1995), any activity can been defined through the objectives of the activity for the person or the community. The activity is performed by the single person or by the community members. The activity consists of goal-directed actions. The goals of the actions are realised by performing certain operations using the tools (material- or knowledge-tools, language) as the mediating devices. The objectives of the activity can be realised as the outcome of the activity, such as knowledge artifacts, community practice etc. For Kuuti (1995) the learning environments can serve at the same time as the mediating tools, aiding knowledge construction and communication, but also the objective of the activity that turns implicit community knowledge externally observable. The latter is especially a characteristic to new social software tools (e.g. social bookmarking) where the community activity can form new connections between knowledge artifacts and people.

The learning activities may be categorised according to their general pedagogical aims into the following groups: assembling the learning environment, community formation and grouping, information filtering, collaborative creative assignments, assessment and evaluation, and regulation, monitoring and support. Each activity can be described as the sequence of actions. The actions convey pedagogical meanings. For instance the activity of forming study groups may consist of: facilitators' actions of guiding learners how to form teams and use tools for it, sending/sharing this information with the learners via email, blog and face-to-face communication; and learner's actions of finding the

teammates; making access to team-members; deciding (or not) the central leadership in team, publishing the team blog in shared area. Actions in each activity involve subjects, tools and artifacts that all add constraints to the performance of actions.

Subjects have different alignment within the community activities (roles or distribution of actions and operations), and they follow different rules that constrain the possible actions and operations with tools and artifacts during the activities. Subjects' activities can be distinguished into learners' and facilitators' paths or specific types of role-parts if the activity structure presumes so (e.g. in role-plays, jigsaw, six thinking hats, and other techniques).

Artifacts are virtual (e.g. webpage) or real objects (e.g. book) with objective properties conveying subjective meaning**.** The subjects define the meaning of artifacts in the context of an activity. Subjects use tools, while performing actions. Activities form specified *workflows* in parallel or sequential order or loosely tied *activity diagrams,* which do not define the sequence of activities to the final details.

Activity diagrams represent students' performances. The absence of centralised platform and central coordination of activities in distributed environments makes the detection and generalisation of activities complicated for students and facilitators. Formalized activity schemes can describe the properties of a performed activity. The activity schemes can connect people, artefacts and tools into the sequenced time flows, and enable to visualize what is happening at the particular learning environment. Construction and analysis of activities helps learners to understand how they act, communicate, coordinate, and collaborate at their distributed personal environment. Activity diagrams may also be used for evaluating the effectiveness of activities or learners' performance. Using activity diagrams as tools of planning, monitoring and evaluating self-directed activities may serve as a useful tool both for the student and the facilitator to reflect upon their activities. The application of diagrams may help to generate new successful activities and see the critical problems in one's learning behaviors. Due to the ongoing personal development and constantly evolving distributed personal environments activities are also in continuous change.

While describing an activity it is important to consider how learner performs the actions, which resources and artefact she/he uses, and how he/she perceives the possible use of tools within the personal environment in the context of this activity. For each learner, the connection between actions and tools in their distributed learning environments is realised by actualizing certain affordances. More than one tool can afford to perform certain activity. The performance of actions with certain tools or knowledge artifacts cannot be determined by the teacher authoratively, but needs the involvement of learners' perspective.

Research design

Participants

The research involved 25 master level students and two facilitators from Tallinn

University. The age of the students varied a lot, being between 20-50. Most of them were active secondary school teachers, some of them worked in other fields such as industry or public service. Students‘ had different ICT skills, ranging from the basic use of e-mails and web browser up to the high level programming knowledge. Some of the students were familiar with the concept of social software but only few of them had used weblogs and communication tools (eg. Skype, MSN) outside of formal education. Facilitators of the course were proficient users of social software applications and had experiences in supporting online-courses.

Research context

The study was conducted as part of the master-level Educational Technology course at Tallinn University in spring term 2007. The main goal of the research was to investigate the possibility of running the Educational Technology course mainly with the new social software tools that encourage students to be more autonomous and self-directed at learning and work situations. It was presumed that the application of social software tools would enable them to compose their own personalized learning environments and allow them to plan learning activities that make use of the shared knowledge construction, self reflection, monitoring and social knowledge retrieval features of the social software. Such a change in the course design was undertaken to introduce students with more authentic situations and preparing them to meet challenges what emerge when they need to plan knowledge building without the access to the institutional learning management systems. Students need to acquire competences of how to technologically support the fulfilment of their objectives during life-long learning. The bottom-up approach to find and develop alternative ways of using social software was applied leaving students lot of freedom of developing their own meaningful learning activities in personally integrated systems. Furthermore, the course aimed at promoting students´ active participation of social knowledge construction processes in which they need to integrate their personal learning environments into the group systems.

The main objectives of the course were:

- To give students authentic, personally meaningful and challenging learning experiences by using social software.
- To introduce students with the concept of self-direction in distributed personal and collaborative learning environments constructed of social software.
- To provide students conceptual tools for visualizing their personal and group environments that mediate self-directed and collaborative learning and knowledge building.
- To introduce students with the concept of activity diagrams within the distributed environments, as the tool for planning and monitoring self-directed individual and collaborative learning and knowledge building activities.

The course lasted for 8 weeks and included three face-to-face contact days in addition to individual online assignments between meetings. Contact days focused on the practical activities, intending to familiarize students with different social software tools. Theoretical framework of using social media for self-directed and collaborative learning was explained

in seminars. The assignment students had to carry out during the course were about developing and testing personal and collaborative distributed learning environments. They had to assemble a personal and collaborative learning environment of social software and describe one activity in this environment. Essential in contact days was to present their activites in formed learning environments.

Research environment
For the course, distributed communal environment was developed (see Figure 1), which consisted of the course weblog (Wordpress.com), social bookmarking tool (Del.icio.us), slide repository (Slideshare.net), wiki for course reflection (PbWiki.com), synchronous communication tools (Gabbly.com; Skype.com), and common aggregator (Pageflakes.com).

The course weblog (see http://kaugkoolitus.wordpress.com) was maintained by two facilitators. The primary function of the course weblog was organizing learning materials and assignments, and serving as the information channel between students and facilitators. The learning materials were presented at separate pages of the weblog. Only facilitators had a right to edit each page. However students could contribute to the course weblog by writing comments. This enabled to make additions to the learning materials if needed, and adapt them to the learner's needs. The cast feeds from social repositories of educational materials like Slideshare.net and Splascast.com were integrated into the learning texts at weblog pages. Learning resources situated at different repositories were additionally linked to the sidebar of the weblog. Weblog sidebar provided links to the course monitoring tool in Pageflakes.com, course wiki for collaborative writing in PbWiki.com, and the collection of social bookmarks for the course in Del.icio.us.

The course aggregator in Pageflakes.com (http://www.pageflakes.com/kpata/12983138) served as the second central place, integrating different distributed software with feed and mashup technologies. The course aggregator brought together feeds from course weblog and students' weblogs enabling mutual monitoring between students, as well as, between facilitators and students. Different widgets from Pageflakes.com enabled to embed to the aggregator a public forum, a page for announcements, access to the synchronous chat tool Gabbly.com, the tagcloud feed from the page of social bookmarks of the course, and the mashed course tag feed from different students' social bookmarking tools. Thus, the aggregator served as the central tool of the course management and monitoring of each other. Figure 1 demonstrates, how the distributed tools were bound together into the communal course environment.

Students were asked to enter to the learning process with a set of individual tools from which the weblog and social bookmarking tools were required. It was not requested that students must make a new weblog for the course, instead they could enter to the course with their existing tools and filter the certain postings in weblog or social bookmarking tool with the course specific tags. This approach was taken to encourage students to use the tools that they had previously used for personal knowledge building and knowledg management purposes, and teach them new practices how these tools could be used as part of their

learning or work processes. During the course students were asked to present the completed assignments and their reflection about their work in personal weblogs. This enabled to monitor their development in between contact days, and give suggestions how to improve their learning environment and activity designs. Weekly basis facilitators provided individualised support and feedback to the students by commenting their weblog posts. Students were encouraged to monitor their peer's progress and comment their assignment posts as well.

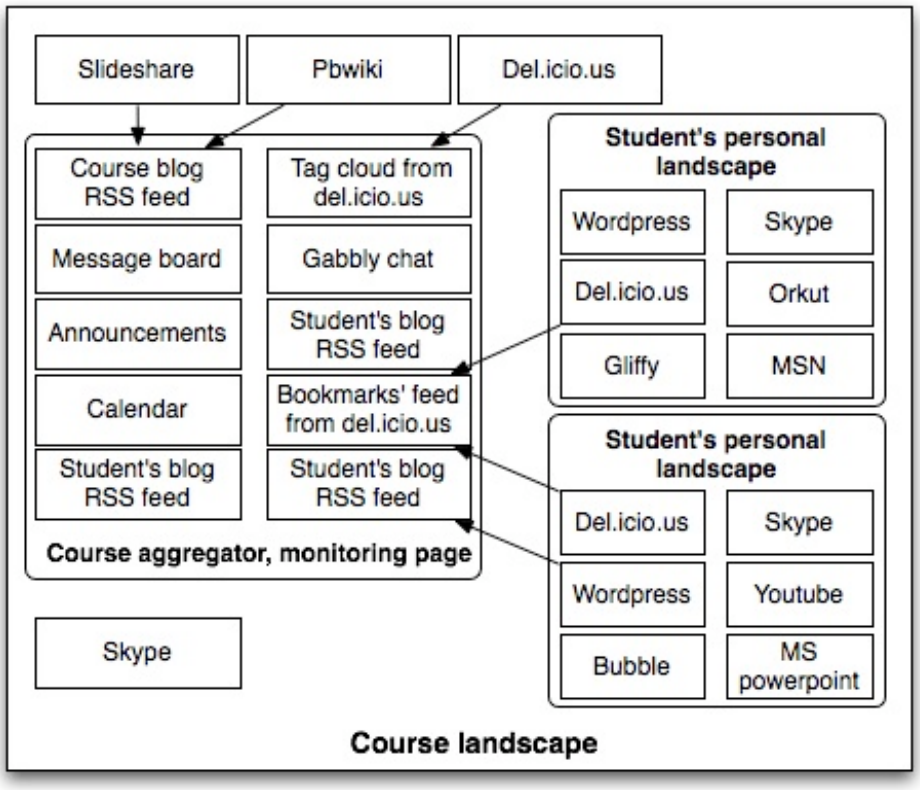

Figure 1. Course landscape scheme

Every student initiated his/her own social bookmarking account in Del.icio.us, where they tagged course related materials with the course tag. Also facilitators tagged the materials, which were relevant to the course, with the common course tag. The addresses of the students' weblogs were collected as following: each student bookmarked the webpage address in his or her personal social bookmark account using the common course tag. The mashed social bookmarks' feed collected all the weblog addresses, which could be seen from the course aggregator. The facilitators added students' weblog feeds to the public aggregator page.

During the course the set of tools and systems for social publishing (for instance docs.google.com; pbWiki), synchronous communication (Vyew.com, Gabbly.com), tools

for creating visual models (Gliffy.com, Bubblus.com), creating and storing knowledge artifacts (Slideshare.net, Lemill.net, Spalshcast.com), and aggregation tools (Pageflakes.com, Netvibes.com) were introduced to the students. Several examples of aggregating personal and group environments were described in learning materials, encouraging students to creatively develop distributed personal or collaborative systems that they could use in their studies or at work.

Data collection and analysis
The data was collected from the students‘ course assignments. By this bottom-up approach it was intended to gather the various perspectives students could bring in to the course design.
Qualitative data from the following assignments were collected:
1. Students‘ different schemes of their personal and group environments consisting of social software tools with the explanatory description.
2. Students‘ different schemes of activities at their personal and group environments.
3. Students‘ essays about the learning affordances they perceived as part of these visualised landscapes and activity diagrams.

Research instruments mentioned above were combined. The purpose of data analysis was to detect their understanding of what the tools in their distributed learning environment allow them to do with respect to the activity they want to perform. Thereby, the learners‘ perspectives to the tools were collected.

Two persons independently collected and categorised the affordances from schemes and texts. One of them was facilitators of the course and one of them the student, who participated in the same course. The differences between their catogories were resolved after comparison and discussions. Affordances were collected from the schemes and initially categorised according to the tools they were related to. Each particular affordance could be listed only once in relation to the certain tool. Next, the second order categorization of affordances according to the activity types was undertaken. The base of the activity types emerged from the analysis of different students‘ activity diagrams in combination of tools‘ use. The list of 9 pedagogical activity types was developed for this research.

Self-tutoring activity type refers to the activities related to the concept of self such as self-analysis, self-assessment, planning one’s own activities and time. While the second cluster of activities, *individual creative assignments* collocate creating, sharing and presenting artefacts individually, the group of *collaborative creative assignments* focuses on the same aspects, but in a collaborative work context. *Assessment and evaluation* activity type embraces giving feedback to students, not only by facilitators, but also by other students; assessing and evaluating students‘ learning process and the outcome. Activities like finding, selecting, using and evaluating the use of tools and systems for creating one own’s environment form the type of activities related to the *learning environment assembling*. Privacy issues as well as right management were added to this group of activities as they influence the selection as well as the use of tools and systems.

Community formation and grouping refers to the activities that support group formation and tasks‘ division between group members. Activities related to the *lecturing and presenting* consist of publishing artefacts, presenting information in different media formats, advertising news flows not only by facilitators but also by students. *Information filtering* activity type means managing and understanding any kind of information. Some of the example activities are tagging information or content flows, filtering weblogs and news feeds, collecting, aggregating and mashing different feeds. Last type *regulation, monitoring and support* collocates motivating, supporting and supervising students, asking questions, monitoring facilitators‘ and students‘ activities.

Using this second order categorization enabled to count the frequency of perceiving certain type of affordances per activity type and compare the main social software tools used at the course from the pedagogical perspective.

Such data-collection and analysis method was useful to understand what is the learners‘ perspective to the social software used as part of their personal learning environments. It helped to capture students’ understanding of distributed environments, the way they made use of loosely coupled social software applications in order to form a personal and group environment. Furthermore, students‘ expectations and perceived potentials for actions with selected tools and systems were detected.

Results and discussion

Visualisations of the students‘ environments emerged to be an important tactic for students to shape their conceptual understanding about the distributed personal and group learning environments. The changes at the schemes of distributed environments could be observed from sequential posts in students‘ weblogs. They offered data of how students acquire more complicated understanding of environment functionalities and how the different selected building blocks can be tied together by continuously changing workflows and mashed feeds. Such changes were undertaken by most of the students. The conceptual changes of students‘ understanding of distributed environments are illustrated in Figure 2.

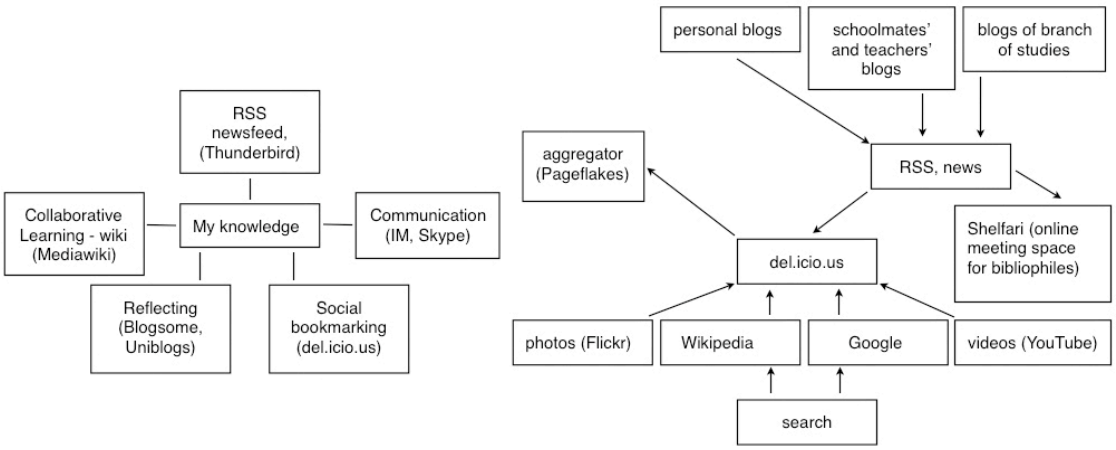

Figure 2: From clustering personal tools by functionality towards distributed tool environments

At first students‘ understanding of their environments can be characterised as centralised view putting a student in the static center. It was complicated for them to capture the comprehension of distributed learning environments, where the center of the environment changes from moment to moment according to the peculiarity of the particular action. This approach was called a „sunray“ model as it refers to the situation, where everything revolves around static center. Students‘ conceptual understanding of such an environment changed during the course due to the several attempts of envisoning their landscape of tools and systems. Conceptual changes can be explained with the concept of affordances which directed students to think of their activities in connection with potential tools and systems. Gradually students started to understand the information and content flows between tools and services, constantly changing center of the environment and distributed self between the tools in their environment.

Following two figures (see Figure 3 and 4) demonstrate the perceived affordances of every student with respect to the activities they wanted to perform and tools they selected and used. As students had a chance to choose their own tools for forming their environment, it is important to note that these 4 tools indicated in two following figures were the most popular in students‘ environments. On the other hand as not all the students made use of these 4 tools the number of related affordances doesn’t represent all the students‘ perception.

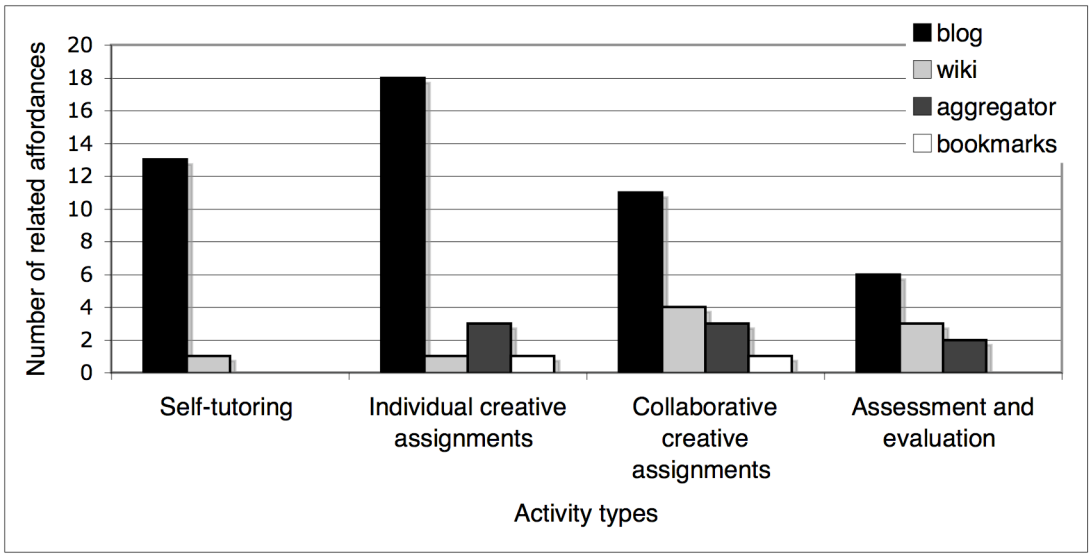

Figure 3. Students perception of affordances I.

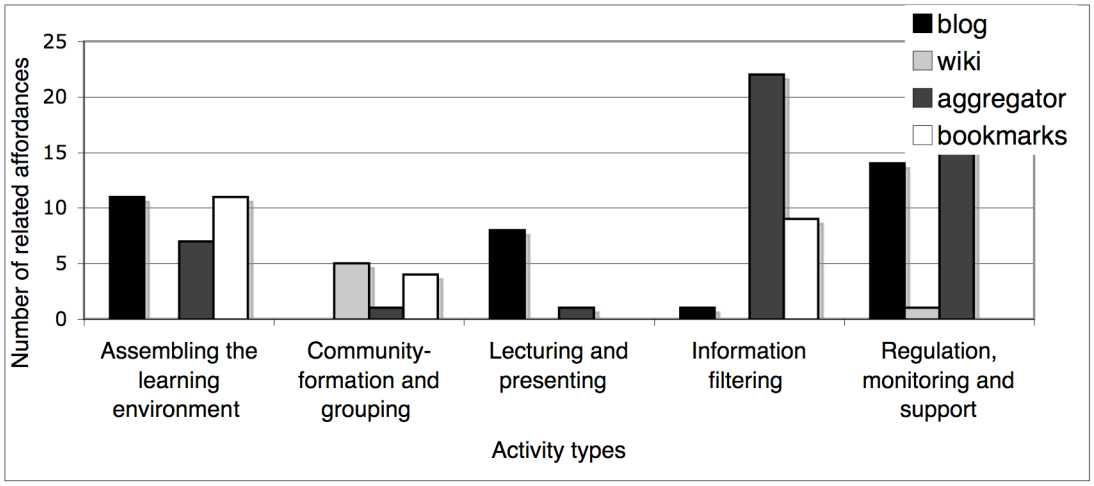

Figure 4. Students perception of affordances II.

Students' perception of weblog's affordances
From figure 3 and 4 it can be interpreted that students perceived weblog as a tool that has the widest range of potentials for action. One of the reasons might be hidden in a fact that weblog was one of the obligatory tools students had to use and therefore the probablity of spending more time on familiarising with the tool and understanding its functionalities is much higher.

Student found several affordances that could be classified as supporting the activities related to *individual creative assignments* (see figure 3): getting tasks, browsing thematic information, reflecting on artifacts in the weblog and revising information. However, there was a high number of affordances, which presumed interaction with other student's work, such as commenting the posts, sharing files and giving feedback to peer's work. This indicates the paradigm change, where commenting and sharing each others' assignments during the activity shifts the emphasis from the outcome-related assignments, where students must produce a final artifact only, towards increased attention to the learning process itself in which students develop and dynamically change their knowledge.

A number of activities could be classified as supporting the *self-tutoring* activity type. Affordances such as self-reflection, self-analysis, self-evaluation were perceived as part of weblog functionalities. This indicates that weblogs might be used actively in education for self-directed learning. Other affordances mentioned by students were creating time-tables and action plans and doing homework.

One of the students mentioned the affordances of relating weblogs with other mediating environment, indicating that indeed such affordances are perceived, which are evoked by the interrelations of certain tools, not only by one tool. On the other hand it is interesting that students did not mention any weblog affordances related to *community formation activity* since it is generally believed that weblogs might be a good tool for social

networking. Thus course design should try to initiate more such activities that are related to social networking using new social software functions. Besides community formation, running the community as a creative system is becoming increasingly important.

The most frequent affordances related to *lecturing and presenting* activity type were giving tasks and presenting information to the learners. The fact that students could see these pedagogical task-related affordances is promising for the educators who would like to use weblogs primarily as the teaching tools. Some student, however, generalized this affordance and did not mention task-specific actions - affordances what they perceived as creating information and publishing artifacts are the most general functions commonly related to the weblogs.

Only one affordance was classified as supporting the *information filtering* activity type: understanding the information given by the facilitator. However, this affordance still indicates towards cognitive information filtering, rather than information retrieval by using various technical features social software offers. Weblogs have several ways of filtering information by tags, keywords, incoming RSS feeds, tag-feeds. From the perspective of course design, it can be concluded that the facilitators need to plan more activities where students could actively try out how to use such social information retrieval methods.

Students perceived various affordances supporting the *collaborative creative assignments*: such as communication with the co-learners and the tutor, sharing and exchanging information with learners, collecting the results from the group activity and coordinating the information among the group of learners. However, it was evident that students did not yet perceive all the possibilities social software allowed to do, for instance mashing feeds, retrieving information using tags or social browsing etc.

Affordances belonged to the *assessment and evaluation* type of activities were evaluation of learners‘ new knowledge, getting feedback and learning from the result of group activities. Notable is that the last two are related to what students can gain from assessment activities. Students were not able to bring out many different affordances weblog might offer for evaluation. This indicates that facilitators should develop a bigger variety of assessment methods that originate from the weblog functions. It is important that assessment and evaluation procedures were used for increasing students' motivation to learn, and were not merely seen as grading instruments.

Finally affordances related to the activity type enhancing *regulation, monitoring and support* were mentioned by students, such as facilitators monitoring learner's action and reflection, supervising learners, giving feedback and supporting, recognizing students and giving enthusiasm.

Students‘ perception of aggregator‘s affordances
The majority of aggregator‘s affordances perceived by students is related to the three types of activities: *assembling the learning environment*; *filtering information*; and

regulation, monitoring and support. Aggregators have commonly introduced as personal tools, while in this master course it was used as a group tool. Thus students perceived mainly the affordances related to monitoring and filtering information. Since aggregator was one of the central tools in the course environment, where students could monitor each other's weblog feeds and initiate writing feedback, this was strongly influencing students' perception of aggregators. However, students have not paid much attention to the mashed bookmark feeds and bookmark tagcloud, which were also accessible from aggregation page. The widgets supporting asynchronous and synchronous discussions were part of the group aggregator, thus aggregator was perceived also as a possibility to support community-formation activities.

Affordances enhancing *information filtering* type of activities were: aggregating social tags feeds/artifacts' information, collecting friends'/community feeds, creating personal filtering for the feeds. Notable is that while some learners perceived information as feeds, the others named it artifacts or information. It may be assumed that this represents two types of thinking: technological (feeds, tags) and information-related (artifacts, blog posts, info). Affordances related to the aggregator express very clearly students‘ new type of technological understanding of social software - the terms like feed, social tag, aggregation, and filtering appeared in most of the affordances of this group.

Affordances of aggregators related to *regulation, monitoring and support* type of activities were: getting the instructions, monitoring students' feeds/artifacts, aggregating feeds, sharing personal feeds. Interesting was that students named affordances similarly in relation to facilitator's as well as students' regulation, monitoring and support activities. This indicates that learning situation is diminishing the difference between the facilitator's and learners' roles.

Affordances belonging to the *self-tutoring* activity type were missing. *Individual creative assignments* were supported by few affordances like collecting information, reading feeds and selecting information. *Collaborative creative assignments* were supported mainly by the affordances of collaborative monitoring the feeds or co-learners. Again the two distinctive perceptions - technological (feed) and learner-related (co-learner, student, user) can be found when expressing the affordances. Assessment-related affordances were evaluating feeds and getting feedback. Similarly to weblog affordances for learning, learners saw two aspects of evaluation - facilitator who does the evaluation and student benefitting from the evaluation. The only affordance supporting *lecturing and presenting* activity was publishing feeds.

Students‘ perception of wiki‘s affordances

As wiki tool was not represented very intensivly in students‘ environments and it was hardly used in the course, the perception of its potentials for action remained moderate.

Affordances, which students perceived while using wiki, can be categorized mostly as activities related to *collaborative creative assignments*, such as joint writing, community

analysis of completed tasks and analysis of action plan made for group. This is not surprising being the most common and most-mentioned activity type, because students' mainly used wiki for collaborative tasks and less for individual purposes. In addition, some students perceived the affordances of wiki related to *community-formation and grouping*, for example supporting the development of group, creating the work group, agreement on tools and dividing the tasks in group.

Activities related to *assessment and evaluation* was another activity type which was mentioned a lot. Affordances like learning from joint writing, analysis of thesis' structure and giving feedback were mentioned equally. Activities supporting *individual creative assignments*, only one affordance was mentioned by students – correction of given information, which means that students used individually wiki for text editing. Furthermore creating a plan was one affordance perceived by students referring to the *self-tutoring* activity type. Monitoring the feedback was the only affordance mentioned in connection with *regulation, monitoring and support*. Probably students found that if they work and learn together in a group, wiki is most suitable tool for monitoring the feedback that comes from group members or facilitator.

None of the affordances were mentioned related to the activities *lecturing and presenting* and activities related to *information filtering* and *assembling the learning environment.* Especially ineteresting is the fact that students were not able to perceive wiki as a presentation tool as it can be easily used for instance presenting home assignments.

Students' perception of social bookmarking affordances
Another compulsory tool for students was social bookmarking tool in order to advertise their blog addressess by tagging them with agreed course tag. It is interesting to see how big is the number of related affordances with respect to the social bookmarking tool while *assembling the learning environment*. Obviously it is influenced by the compulsory activities students had to perform with social bookmarking tool. Similar influence can be seen regarding the affordances related to the *community formation and grouping*. On the other hand social bookmarking can offer opportunities to find and select tools and services by subsribing others' tags which refer to the experiences that others have had with different tools or find links to the collection of social software tools and services.

Students' perception in terms of *information filtering* was naturally the most frequently mentioned affordances, which indicates that social bookmarking tool was understandable and comprehensible. Tagging important information despite of the medium used for presenting the information was the main affordance perceived by students.
Results with respect to missing affordances related to the activity types such as *lecturing and presenting, self-tutoring, assessment and evaluation, regulation, monitoring and support* were estimated. In addition, affordances supporting *collaborative and individual creative assignment* remain moderate mainly sharing the information and saving artifacts, which was expected.

Implications and conclusions

The purpose of the research was to study how to change the design of the course in a way that it takes into account students‘ understanding of the environment and the way they perceive it. Research was embedded in the course described above, which provided challenging situations for students, where they can experience how to form personal and group environments from the selection of social software tools and services.

In this research students‘ conceptual changes with respect to their learning environment were monitored. Research was looking for answers to the following questions: what is needed to make students control their environment, what are the activities that need to be carried out in the course in order to teach the use of social software and make students to see their affordances as well as benefit from them. The concept of affordances helped us to understand how students perceive their environments while acting in it.

The analysis showed the variations between students‘ perceptions of affordances. Accordingly facilitators perception towards affordances can be different compared to the students‘ percpetion, which makes the choice of the right medium and environment for somebody else complicated. Grounding internally or externally with the peers or with the facilitators upon the learning affordances for particular actions becomes essential part of the application of the learning environment. Learner and facilitator must develop a compatible understanding of the affordances of a given setting to make effective performance possible at certain distributed social software environment. The similar application of the tools, functioning rule-system and distribution of labor that support the realization of certain objectives in the learning environment can be realized upon the commonly perceived affordances. Facilitator cannot predefine but only anticipate the affordances of the learning environment. Thus, learning environment cannot be ready when learning starts but has to evolve in the learning process. Secondly, affordances should be conceptualized as a dynamic concept (Cook & Brown, 1999). The dynamic changes in the perception of learning environment must be considered as part of the learning design model: iterative cycles of grounding and regulation with conversational actions among the learners and the facilitator about the state of art of the distributed environment, and the development.

Therefore instructional designers should take into account students‘ perception and expectiations of the learning environment as one of the important aspects in course design. Furthermore, challenging situations for students should be created in order to practice the selection and use of tools and services according to their own purposes. Thus there is an urgent need to look for new pedagogical approaches and models that place the learner into the center and help to enhance learner’s self-directed competencies with respect to organise own’s learning environment.

Dynamic changes in students‘ perception of the learning affordances of their personal environments and the anticipated affordances for performing certain activities in these environments indicated towards the need for changes in the facilitator’s role during such learner-centred social software based courses. Students‘ different perception of social software as personal learning and knowledge building and management tools suggested a

number of aspects what must be considered in the learner-centred course designs with social software.

Course design should promote activities that:
- enhance social networking;
- allow commenting and sharing of each others‘ work, reflecting the process instead of the outcome;
- advance self-direction and self-awareness in distributed learning environments;
- enable community and group formation;
- support social information retrieval and filtering, mashing feeds;
- allow bigger variety of assessment methods;
- enhance technological as well as information related thinking;

It can be concluded that students perceived the main affordances embedded to the tools. However, there is a need to design more specific tasks that help students to perceive somewhat hidden or specific functionalities of the tools.

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ANNEX 3
ARTICLE II

Self-directing at social spaces: conceptual framework for course design

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Abstract: This paper examines the use of social spaces in order to foster self-directed learning activities in higher educational institutions. It argues that current instructional design models need to be adjusted with respect to self-direction according to the continuously changing processes in post-industrial society. Based on empirical research conducted with master students it attempts to design a conceptual framework for course design with the emphasis on self-direction in social spaces.

Introduction

In near future five fundamental transformations are predicted to happen in enterprises: the globalization of the economy; the management of work; the disaggregation of organizations; the maturation of the workforce; and the reconfiguration of employment (Snyder, 2006). It is predicted that new post-industrial economy is design-orientated, wherein information-rich small creative companies are the major drivers of innovation, working in a new flexible mode of producing cultural goods and services (Fasche, 2006). The universities must meet the needs of this new post-industrial era, prompting learners‘ creativity by offering them meaningful and authentic tasks that bind the university requirements together with personal objectives in industrial environments.

The predominant assumption in current institutional learning environments is that mainly developers are responsible for system development, while teachers and learners are in the role of users. It is not considered, however, that with the increased use of social tools in learning and work processes, the innovative processes between users and developers are negotiated at much deeper extent during social shaping of these tools (Burns & Light, 2007). Thus, learners and teachers should also obtain the competences of thinking new ways of learning environments - forseeing the effective functionalities of social spaces in order to conduct teaching and learning processes, and managing and developing them as systems that support their personal and group learning and work objectives.

Nordgren (2006) has listed important themes that must be solved in educational institutions in order to provide the future learning environment:

- Students owning their learning
- Standards and curricula that guide rather than dictate
- Constructivist teaching strategies that empower students
- Trust and adult supervision
- Democracy and empowerment
- Global Workforce Competence: Making schooling relevant to the workplace.

Thus, universities should provide experiences with shared power (democracy) and responsibility, developing learners‘ self-directing competences of learning and working (Fischer, 1999) in dynamically changing and globally intertwined industrial environments, as well as in their workplaces and private lives outside the classroom, where institutionally offered ICT systems are not provided. This paper elaborates the conceptual framework for course design that aims at developing the competences of self-directing learning related activities in new web-based social spaces. We introduce the course design principles and the results of the evaluation of the course.

Web 2.0 social spaces for self-directed learning

New democratic social media tools give new freedom, increased creativity and responsibility for the learners. Modern learners inhabit various spaces: Weblogs (Blogger, Wordpress), microblogging environments (Jaiku, Twitter), social repositories of new media objects (Flickr, Youtube), social bookmarking spaces (del.icio.us), community portals (Facebook, MySpace) etc. Innovative enterprises (eg. Siemens, BBC) have already started to use social media for various purposes, for example, for liberating the workforce from the constraints of legacy communication and productivity tools; making use of collective intelligence of many, transforming competitiveness in the form of increased innovation, productivity and agility. It has been suggested that the main change in industries will be the reorganisation of knowledge creation at horisontal (between industries and universities) and vertical (within industry) level (Beach 2003). However, learning process at the university level has ignored at great deal these new spaces, building the learning processes up in the institutionalised systems, that do not resemble authentic new social settings, what learners meet in their everyday and future work life. Main changes at new Web 2.0 social spaces, compared with institutional learning management systems, are:

- Self-manageable tools;
- Learning at personal spaces;
- Continuous invasion to new spaces
- Distributing one’s personality between spaces;
- Community as an identity
- Publishing artifacts to define communities and ourselves

These main changes at Web 2.0 social spaces require a considerable degree of self-direction and self-management. Self-direction refers to the increased freedom, independence, responsibility and autonomy of one’s activities. It means the capability to process information effectively, and be aware of one’s abilities and skills. In this paper we refer to the self-direction as a continuous learning process, an instructional method, where individuals take the initiative in order to diagnose their needs, set up their goals, choose the strategies and resources (Lowry, 1989). Additionally, it presumes personal efficacy of self-analysis and self-reflection, the ability to be conscious of own needs, and experiences of positioning him/herself within the learning situations. Brookfield (1994) characterises self-direction on the one hand, as a continuous exercise carried out by the learner having a control over decisions related to the learning, and on the other hand, as the ability to access and choose from available resources. Thus, we argue that the freedom to choose the most appropriate tools to mediate one’s activities, and the opportunity to create personally driven learning spaces are part of the means, prompting towards decisions that need to be handled by learners themselves.

Self and self-direction are the subjective concepts influenced by many factors. Self-directed learning activities take always place in a certain social context and cannot be separated from that social setting and

other people (Brockett & Hiemstra 1991). Thus, we cannot talk about pure autonomy and absolute freedom, rather self-direction is framed by other individuals and groups (Lindeman, 1926). Furthermore, environment and surrounding culture, social spaces and communities we create and belong to, people we communicate determine our consciousness and dictate our self-directed activities.

Knowles (1975) has introduced the model of activities that form a self-direction: diagnosing needs, formulating needs, identifying resources, choosing and implementing suitable strategies and evaluating outcomes. According to the model our attempt was to provide a challenging situation for learners, which helps them to move from being dependent on instructions given by teachers, towards being independent individuals with increased learner control and personality.

New Web 2.0 distributed social spaces enable learners to simultaneously keep their personality in multiple social-, work- and learning spaces and mark their presence in different modalities. The result of keeping distributed self increases likelihood that person‘s external knowledge, artifacts, meanings, activity patterns will be noticed, modified and duplicated. Keeping distributed self keeps the person in touch with different learning-, work- and social communities. Being simultaneously the member of different communities enables to the person to bring information across the borders of the communities, enabling to constantly create new knowledge (Beach, 2003). The maintenance of distributed self has also become external – people and groups tend to feed together their distributed spaces into aggregators or weblogs in order to feel as a whole, and observe their external presence. In these spaces, where their distributed knowledge meets again, people can propagate themselves as the connectors between the communities. If they mix their distributed self with the knowledge of other community members (like in microblogging feeds of Jaiku or Twitter), these mashed feeds start triggering new ideas, providing knowledge community-wise access, and enabling to transfer knowledge to the other community spaces.

In order to be able of using social spaces effectively as learning- and work-environments, the educators should:

- Provide learners with cognitive tools to self-manage the distributed learning spaces, and suitable activity patterns in these spaces (eg visual language to plan personal and group environments from social tools and to describe activity patterns at these spaces);
- Enlarge learners’ conceptualization of distributed social systems as dynamic and ecologically defined spaces, in which tool properties are not fixed, but depend on (co)learners‘ objectives, preferences and commonly grounded activity patterns;
- Develop learners‘ competences of handling socially defined tools for organizing learning and work processes;
- Develop learners‘ competences of using feeds and mashup technologies for developing distributed learning spaces and maintaining distributed self;
- Advance learners‘ reflection and monitoring competences in social spaces to get awareness of their own and of other learners‘ activities;
- Support learners to stream towards conscious connectivity for transforming knowledge from one community to another in order to keep the communities and knowledge in constant development (Siemens, 2004).

Course design framework for self-directed learning with social media

Current institutional learning environments are mostly tutor-defined and well-controlled mediums where learners are seen as residents, while Web 2.0 social spaces introduce new nomadic behaviours (Pata & Väljataga, 2007). Traditional instructional models applied in these environments, like for example ADDIE model, convey the ideology of sequential activities, reduced learners‘ responsibility and self-directiveness, without considering learners‘ differences and interests in the development of learning activities. ADDIE model stands for 5 steps: analysis -> design -> development -> implementation -> evaluation, but this linear process has its limits in new learner-centered situations. For first, ADDIE model should take more advantage of digital technologies that allow for less-linear approaches (Bichelmeyer, 2005). Compared to

linear task-centred instructional design models, where tools are determined for each activity by instructors, new design process targets learning environment as a whole, creating a medium where learners' objectives are supported with motivating activity structures and freely selectable tools. Learning environment design process follows the spiral cycle of development – course design process is continuous and gets input from several evaluations from multiple perspectives. The main aspects to pay attention in new type of learning environment design models is that learners could perceive themselves as self-directed personalities who can seek opportunities to take over the locus of control and responsibility in their learning. New type of learning management systems should provide individuals with the means of acting within communities, and enabling personalisation in terms of selecting tools and systems, strategies, methods and objectives (Pata & Väljataga 2007).

Objectives of the course

New type of master-level course „Self-directed learning with social media" was developed at Tallinn University to meet the conceptual framework of self-directed learning in distributed social spaces. The pilot course was run at spring 2007, current paper elaborates the application and evaluation of the course design framework at fall 2007, when course was run second time.

Four main objectives were theoretically grounded for the course from teacher's perspective:
1. To create challenging situations for learners, where they can experience self-directed learning processes as individual and collaborative learners, using social media tools;
2. To introduce learners with the concept of distributed learning environments for mediating their self-directed individual and collaborative learning activities, and providing them with conceptual tools (eg diagrammic language) for creating visual plans of their tool landscapes and information flows within landscapes;
3. To introduce learners with the concept of learning activity patterns within the distributed learning environments, and providing them with the conceptual tools for planning self-directed individual and collaborative activities.
4. To introduce learners with the concept that pedagogical properties of tools in learning activities are emergent in activities, and dependent of users objectives, in order to emphasise that the learning space must be dynamically conceptualised for self-directed individuals, and furthermore, these conceptualizations of tool functions must be continously grounded during collaborative activities.

Two main objectives were theoretically grounded for the course from learners' perspective:
1. To get basic competences and experience, how to plan their master studies self-directed way, using new social kind of tools that aid the construction of personalised learning landscapes, and conducting more effective connective activity patterns in these.
2. To get competences of using social media at computer labs of schools as teachers, but also at other workplaces. As Will Richardson has claimed, nowadays every educator needs to understand the potential impact of tools like blogs and wikis, because of the fact that their own students themselves are using them more and more (Richardson, 2007).

Participants

Participants of the course were the first year master students of ICT Teacher curriculum and Multimedia Design curriculum of Tallinn University. 24 students finished the course. Two authors of this paper worked as the designers and facilitators of the course. Teaching activities and giving feedback to the learners was divided between them equally because of research interests. The third author of the paper participated in the course design and its evaluation.

Learning environment and activities

Course was planned as a distant learning activity with three face-to-face contact days, which mostly focused on practical activities and testing different social software tools and environments, blended with theoretical issues. The distributed communal space was developed for the course, which consisted of the

course weblog (Wordpress.com), social bookmarking tool (del.icio.us), slide repository (Slideshare.net), casting tool (Splashcast.com), wiki for course reflection (PbWiki.com), synchronous communication tool (Gabbly.com), and common aggregator (Pageflakes.com). Learners were asked to enter to the learning process with a set of individual tools from which the weblog and social bookmarking tool were required. During the course the set of tools for social publishing (docs.google.com; pbWiki), synchronous communication (Vyew.com, Gabbly.com), creating visual models (Gliffy.com, UML-creator, Bubblus.com), creating and storing knowledge artifacts (Slideshare.net, Lemill.net, Spalshcast.com), aggregation tools (Pageflakes.com, Netvibes.com) were introduced to the learners, which could be integrated to their personal- and group spaces. Figure 1 demonstrates, how the distributed tools were bind together into the communal course space, pulling separate feeds, and mashing feeds with course-specific tags. This shared space enabled the mutual monitoring and reflection between the tutors and learners.

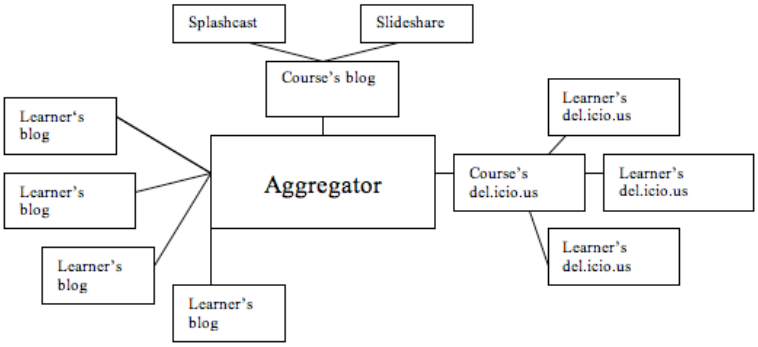

Figure 1: Course's landscape scheme

The course tasks involved four main activities:

- Developement of individual learning space from social tools and presenting one activity pattern in this space (learners were not constrained with the university settings but could develop individual spaces that were related with their other work- or social activities)
- Development of collaborative learning space from individual spaces and presenting one activity pattern in this space (learners were expected to monitor and record their activities in this space to analyze their activities).
- Keeping personal learning contracts for both individual and collaborative tasks.
- Evaluating one's learning experiences at individual and collaborative social spaces on the basis of personal learning contracts.

Learners presented their assignments in their weblogs. This enabled the facilitators and the other learners to monitor their peers' learning process in between the contact days. Another important focus of the course was giving feedback to the learners. Facilitators and other students monitored learners' weblogs and provided support and feedback as much as possible. The comments of peers were favoured. The facilitors' general comments of the learners' progress were provided through the course weblog. An important activity at contact days was the presentation of individual- and group assignments in order to give more feedback to the students'designs.

Evaluation of the course

In addition to the creation of challenging situation for learners to trigger self-directed activities, our secondary research aim was also to evaluate the effectiveness of such a course design. The following questions were asked for the evaluation purposes:

1. Which changes would take place in learners' habits of acting in social spaces?
2. How would learners perceive the concept of self-directed learning in distributed social spaces?
3. What tools would learners consider to be supportive for self-directed learning?

4. Which aspects would learners see as pros and cons of the course?

For evaluating the course, several instruments were used. First, all the learners filled in the questionnaire. Questionnaire consisted of 13 items. Three of them assumed the listing of social media tools and environments (tools which the learners had used before, tools which they will continue using after the course is over, and tools which they think would support their self-directed learning). Few questions expected describing of learners' understanding about concepts like „self-directed learning". And the rest of the questions were about the evaluation of course (facilitators' role, problematic issues of the course, course structure etc).

In analysis, we used quantitative and qualitative methods. The quantitative method was used for listing the social software tools and environments, which were used by learners, and which supported self-directed learning. Answers to other items were analysed with the qualitative content analysis method.

Results

Changes in learners' habits of using social software
Most of the learners didn't have any contact with social media tools before the course. One of the course aim was to give skills how to use tools in collaborative and individual learning process and this aim was achieved. Figure 2 describes, what were the most common tools before the course, and what kind of tools learners decided to use after the course. The highest contrast is between the percentages of collaborative learning/writing environments (CLE). At Estonian universites and schools groupwork is traditionally very rare, therefore learners did not have previous experiences with collaborative learning tools. Probably, this was the reason, why groupwork was highly evaluated among the participants of the course. Richardson (2007) has pointed out, that young learners should get the ideas of collaboration as early as possible. It is an important literacy, because our world is moving toward a business model of the collaborative construction of content, and learning to work with collaborators.

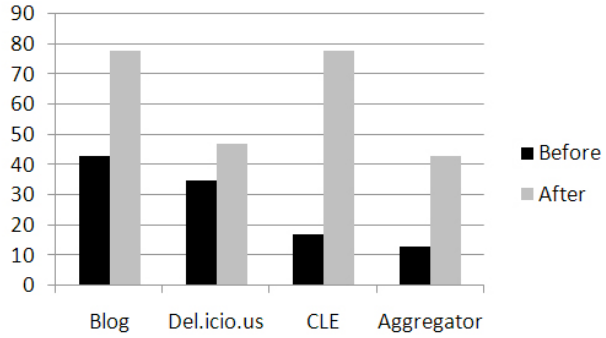

Figure 2: Tool use before and after the course

Learners' perspective of self-directed learning and self-directed learning tools
It appeared that the tools learners would remain using after the course (see figure 2), would be mostly the same which they perceived to be supporting their self-directed learning (see figure 3). Blog is the most important tool supporting self-directed learning in the point of view of learners. Blog is a constructivist tool for learning, and gives learners possibility to reflect themselves. Blog gives a remarkable possibility to archive personal works – all contributions from the beginning of the studies can be held in one personal space, being easily searchable, organized and shareable. While blogosphere is gradually becoming into a wide knowledge pool, from which the authors of the blogs search information, learners who reflect in weblogs would not be writing to the facilitators only, but often can benefit from feedback of other people.

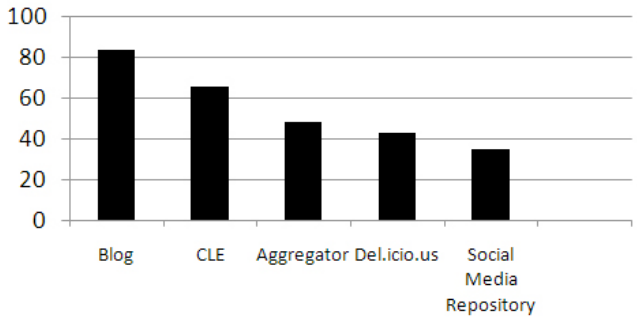

Figure 3: Tools, which support self-directed learning

Another important tool, which supports self-directed learning from the point of view of learners, is an aggregator. Aggregator, that could be used for collecting different RSS feeds from distributed social places (weblogs, social bookmarking tools), was a new system for most learners. Since the learning environment of the course comprised the aggregator, which was filled with different learners' weblog feeds in front of learners, the students could grasp the principles of the tool well. Many teams created their own aggregators, which supported team's communication by collecting feeds from members' blogs, and providing possibility to leave notes or add events to the joint calendar. Some of the learners also created aggregator for schools where they were teaching ICT and other subjects.

On learners' opionion, collaborative learning environments (CLE) also support self-directed learning. During this course, learners had remarkably successful group-work – they enjoyed the systems, they developed very interesting and useful distributed learning landscapes and activity patterns for groups. It can be concluded that, while self-directed learning is most certainly concept for individuality, it can and should be implemented in group-work as well.

Pros and cons of self-directed learning in social spaces
Learners brought up advantages and disadvantages of self-directed learning in social spaces. As table 1 describes, they found that the main advantages of self-directed learning are the freedom to choose the aims of learning, tools which would be used in learning process, time when the learning takes place etc. On the other hand, as one learner commented, this freedom needs responsibility and motivation, and therefore, it might not be suitable for everyone.

Table 1: Advantages and disadvantages of self-directed learning

Advantages of self-directed learning	**Disadvantages of self-directed learning**
Learners create their own system with own tools	Some of the tools might not work all the time
Learners choose what, how, why and when to learn	Learner can stuck into the planned activities and fail
Higher responsibility compared with other learning styles	
More knowledge, new material	Learner can misunderstood the assignment
It is inescapable, everything changes so fast	There is no one to ask help for, if the learner is in trouble
Learners plan their time, tools, environment and speed of learning	It is difficult to motivate yourself
Makes learners think, how to achieve the best result using different tools	Learner needs lot of motivation and self-control in order to coordinate studies
Freedom. Learning through activities	Lack of information
Unlimited possibilities to get new knowledge	Lack of feedback
Learners can work and study at the same time	Learner can depart from the prepared aim
Learners give meaning to their activities and aims	
Advantages and disadvantages can be the same, but it depends on the learner.	

Pros and cons of the course

Learners admitted that for their master studies, course was helpful, as they created landscape of learning tools, which they will use during their future studies. They also found that course should be compulsory for all the master level students in the beginning of their studies. Course made them think, how to organise their work and material better, and what kind of tools and environments would be the most suitable for them. Additionally, competences of using social media tools, learning materials published on the web, lots of practical activities, huge amount of group work, publishing own assignments in weblog etc. were considered positive aspects of the course. However, some of the learners found that compared with the amount of new material and technological tools, there should have been more face-to-face meetings. Still learners mentioned a number of times that the support and constant feedback in weblogs, and the possibility to improve their designes, was extremely important.

Conclusion

The evaluation of the course „Self-directed learning with social media" demonstrated that opportunities to develop self-directed learning, supported by social media tools, were highly praised by the learners who started their master studies. Learners' final weblog posts about the evaluation of the course from the perspective of their personal development explained in detail, how could social media enrich their learning process, their work as the teacher, and their social activities among friends. It was positively mentioned that personal learning environments could be used in professional development, both at work, and in the communication with their social networks. All this indicated that there is a need for offering university courses where self-directedness and personality were put into the priority. Learners should get the skills how to plan their studies with the tools, which are most suitable for them.

The framework of the course, which was introduced in this paper provided opportunities for self-directed individual and collaborative learning. It was found that learners considered the possibility to develop their own collaborative learning environments, using the methods and tools which they considered most suitable for their groups, highly important. Therefore we can conclude that although self-directed learning is a concept of individuality, it can, and should be implemented equally in group-work.

This course serves as a startingpoint for developing a new instructional design model, which supports self-directed learning with social media tools. There are still aspects, that need to be focused in the future, before it is possible to talk about new learning environment design principles. Our future studies are directed towards investigating, how in-service teachers have adopted the social media tools in their work and social activities.

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