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The Development of Self-Direction in Self-Reflections in an eLearning Course

Master Thesis

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ABSTRACT

In this thesis the goals were to find and validate a set of categories as self-direction indicators in self-reflected blog posts, to examine how self-direction develops during an eLearning course and to examine the indicators of self-direction to during the eLearning course to see if and how they are related. The research questions were: what are the identifiers of self-direction in students' self-reflections in blog postings? How does self-direction develop during the eLearning course? How are self-direction indicators interrelated in the eLearning course? This thesis presents the self-direction analysis categories, and the results of using these categories to present the weekly development of self-direction at the course, and the interrelations between the categories. The design-based eLearning course was used for developing and validating these. The methods used were qualitative text analysis and quantitative Paired Samples T-Tests and Pearson correlation. Seven categories of self-direction indicators were created based on theory and text analysis, consisting of 23 indicators. The categories were: “Using Tools”, “Un-clarity and Clarity with the Course”, “Reflecting The self and the self in group”, “Creating Strategy”, “Observed Change”, “Team as a Tool” and “The Voice of the Writer”. The results demonstrated that the students went from self-oriented to group-oriented working in the course. The students used different tools (software, but also team as a tool) in order to get to their goals. Some students reflected on different stages of strategy, for example diagnosing the situation and formulating needs, throughout the course, however using self-directed planning as a tool was not sufficiently evident. The students reflected on their knowledge and learning. “Using new tools”, “Difficulties in using tools”, “Un-clarity with the course”, “Course is clear”, “Reflecting new and old knowledge”, “Diagnosing the situation” and “Writing in the first person” all correlated significantly with each other. “Organizing the group” correlated significantly with all the mentioned indicators but not with the “Course is clear” indicator. “Writing as a part of the group” had significant correlation with “Using same tools”, “Starting to use again same tools” and “Identifying resources”. Identifying resources” correlated also with “Formulating needs”. “Setting goals” correlated only with “Writing in the first person”. Other interrelations were not found. Some categories were reflected less indicating that students do not reflect these issues in their blogs frequently. This highlights the point that if self-reflecting is internal there is no way it can be detected, monitored and supported by the teacher and peers. This is why students should be taught to use external self-reflections. Through the self-reflections it is possible to support and detect the students' self-direction and that way enhance their learning processes. In addition, it is possible that this would promote students to notice their weak sides and improve them. This thesis is the result of one's individual research and has not been presented to a defense session earlier.

KEYWORDS: self-direction, self-reflection, blogs, eLearning

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1 Introduction

This thesis concentrates on self-direction in an eLearning course and how self-direction can be identified from students' blog posts. The importance of self-direction in eLearning was the main trigger of this study, as were the author's experiences from various eLearning courses.

Today, at the era of Web 2.0, new social software technologies have become essential part of everyday life. The next level of development and design of web tools makes it easier to communicate and collaborate in the Web. The new perspective and understanding of the ways to use web had its impulse from the burst of the IT bubble in 2001 (O'Reilly, 2005). Web 2.0 has led to an emergence and evolution of web-based communities and to wide usage of blogs, wikis, and sharing in which eLearning follows the motto: "*Information is meant to be shared*" (Downes, 2005).

ELearning 2.0 is rising as a new method of teaching and learning. Using content-based recourses prepared by teachers to assimilate knowledge with social software technological components is not sufficient. A social way to learn in the web has emerged. Tagging, pulling feeds, mashing and co-constructing information and knowledge in which individual learning is tied to social learning form an integral part of learning in new student- or group-combined Web 2.0 environments (Pata & Merisalo, submitted). Blogs and wikis have come to the field of education. Especially blogging supports the sharing of personal voices and makes it possible to form wide networks of learning in the communities of practice.

All the new tools and social behaviour in these social systems call for revising the established eLearning design models. The narrative and reflective learning as a new method is in the heart of eLearning 2.0. Narrative learning has risen from the point of view that personal narratives are essential for constructing an identity and observing the self-development. Bruner (1996) says that narratives are vehicles in meaning making. In order to be able to construct meanings people need to find an identity within the culture they grow up and live in. This way, narratives are important for a person for finding one's place inside the culture. Bruner suggests that in this point education should help the individuals.

Mayer (2003) has found that when conversational narratives are combined with animations a personalization effect results and the students develop significantly more creative solutions compared to conventional instruction and explanation methods. It is also showed that with

multimedia storytelling students can engage learning by design (Carbonaro et al., 2008). Narratives can also be seen as sources for tacit knowledge; a person might bring up and externalize some tacit knowledge for example in his/hers blog without even realising it (Ala-Mutka, 2009). This explicit knowledge in narratives serves as the basis for community knowledge for joint learning.

The new way of learning follows the idea that content of learning should be developed by students in the course of learning. Students create, use and remix the content according to their personal needs. As learning becomes more and more personified, narrative self-direction is needed to find out the unique patterns, how to construct knowledge and learn from others in the masses of information and knowledge, and to succeed in learning. Self-direction enables the student to be free and self-managing, to be able to be in charge of the learning. Though with freedom the responsibilities will also appear. If the student does not have self-direction he/she might feel lost in the learning experience and end up just wandering around in the web.

This thesis stems from the idea of that when students self-reflect on their learning, somewhere in this written narrative the indicators of self-direction will be captured. In order to enable and support students' self-direction it needs to be identified and recognized. This thesis aims to clarify the categories in students' self-reflective blog posts, which could indicate that self-direction was conducted.

The first goal of this study is to find and validate a set of self-direction indicators in the self-reflected blog posts. The aim of identifying these indicators is to generate an approach of understanding the self-direction phenomena at the course by using the non-obtrusive analysis of students' blog narratives. For validating the applicability of this category system in bringing the sound explanations for self-direction during the eLearning course, the quantitative analysis is used.

The second goal is to use the self-direction indicators for examining how self-direction develops during the eLearning course. The third goal is to examine the mutual interrelations of the self-direction indicators to explain how certain self-direction phenomena occur in the eLearning course context.

The following research questions were formulated to guide this study:

1. What are the identifiers of self-direction in students' self-reflections in blog postings?
2. How does self-direction develop during the eLearning course?
3. How are self-direction indicators interrelated in the eLearning course?

1.1 Acknowledgements

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2 Theoretical Overview

The development of Web 2.0 began from social networking sites such as LiveJournal and Friendster (Downes, 2005). The usage of the Web changed from just reading towards participatory reading and writing. Besides being the source of information for learning, the Web now offers a set of social tools to support personal and collaborative learning. The users can develop, aggregate and remix small units of information called microcontent. Web 2.0 is not just a medium to transmit and consume information, but it has become into a platform in which content is created, remixed and passed along (Downes, 2005).

Even though Web 2.0 has to do with technology it is more of a social revolution. The usage of the Internet is changing; the users absorb information from multiple formats and from multiple sources at the same time, and they do it rapidly. These so called "digital natives" expect communication to be instant and constant (Downes, 2005). It is now about the students to control their own learning by themselves. ELearning is not anymore the process in which content is produced and connected into the strict instructional structure of a course by teachers. It is not anymore about students just consuming what is given. Siemens (2004) says that chaos as a self-organizing phenomenon is the new trend. The students must seek and recognize the hidden patterns of meanings, and to form connections between communities for creating meanings. Reflecting and sharing are important as the core of creating learning networks.

In Web 2.0 and eLearning 2.0 the new democratic social media tools offer freedom and responsibility and also increase creativity. Blogs, microblogging environments, social repositories of new media objects, social bookmarking and community portals are widely used by modern students. For example blogger, Twitter, Youtube, Del.icio.us and Facebook are part of everyday life of many young people. Taking these tools into account, it is evident that new eLearning 2.0 can be realised in personal spaces using the social tools that are self-manageable.

Self-directed learning meets Web 2.0 in the field of the concepts and technologies which enable more effective learning (Klamma et al., 2007). Web 2.0 makes it possible to keep the personality in multiple spaces; this makes it more possible for the individual to be noticed, modified or even their ideas become duplicated. The individual brings information across the

borders and makes it possible to create new knowledge (Beach, 2003). Mixing the self with the knowledge of other members of the community by using mashed feeds enables students to provide the ground for new ideas.

ELearning 2.0 has a lot to do with social media. Along with Web 2.0, social media has become a hit in recent years. According to Mayfield (2007), social media is a selection of tools or services related to the users' objectives, for example conversation and community formation. Social media is about everyone contributing and reacting, participating in two-way conversation. One form of social media are also the digital social networks which are realised in the Web. The networks enable people not only to share experiences actively but also to reflect and publish; to give but also gain from the socially gathered information. People can gain awareness of other people, communities and networks and monitor them; they can also combine tools and resources into a personal or group environment (Constantinides & Fountain, 2008).

Learning in social networks is one aspect of eLearning 2.0. When using social media, the students' objectives and previous experiences of learning, as well as the culture of the social environment, would influence which tools and services the student can use. Social media tools are also providing and shaping cultural tools, which in a way carry socio-cultural patterns and knowledge (Wertsch, 1994).

In these Web 2.0 environments where students combine tools and resources and participate in social media, they reflect and create meanings, and learn through narratives. Self-direction fits to this picture because it is about increased freedom, independence, responsibility and autonomy of one’s activities (Lowry, 1989). Self-direction gives the power to rise above the situation and be in charge of it, and know about your own learning.

2.1 Self-Direction and eLearning

There is no one canonized way of knowing what the indicators of self-direction might be. In addition, the ways to analyze self-direction differ.

The term self-direction has long roots; it has been used for over 150 years. Probably the first time it was seriously taken into account was in 1840 when a publication of “Craik's Pursuit of Knowledge under Difficulties” described behaviour behind self-direction (Brockett &

Hiemstra, 1991). Since these early days of self-direction there have been various definitions to the term.

Hemans (1996) sees that the self is about relatively autonomous and mutually influencing selves which are in dialogical interchange. Self-direction is achieved when these selves are internally voiced. Knowles (1975), on the other hand, approaches self-direction from an activity point of view. He sees that self-direction forms through diagnosing needs, formulating needs, indentifying resources, choosing and implementing suitable strategies and evaluating outcomes. Knowles' theory is also a good candidate for describing some indicators of self-direction. One definition close to the Knowles' (1975) definition posits that self-direction means the students' capability of effective information processing and being aware of the abilities and skills the individual has (Lowry, 1989). Lowry is close to Knowles because he refers to self-direction as a continuous learning process, putting the emphasis to the active individuals diagnosing their needs, setting up their goals and choosing strategies and resources.

Brookfield (1994) suggests two aspects of self-direction. On the one hand he assumes that the student has the control over the decisions related to learning, and he/she carries out an ongoing exercise. On the other hand, he emphasizes the student's ability to choose and access from different resources. Brockett and Hiemstra (1991) see self-directed learning as a combination of forces inside and outside of the individual, making the individual to take responsibility for the decisions associated with the learning process. According to them there is always a social context in self-directed learning. Therefore, the activities of self-directed learning cannot be separated from the social background and other people. Brockett and Hiemstra's definition of self-direction is the second good candidate to provide some perspective to self-direction indicator categories.

Merrienboer and Kirschner (2007) are in the same path as Brockett and Hiemstra, connecting self-direction and the responsibility of the individual orienting him/herself towards learning, planning the tasks and assessing the outcome. The last two points fit also to Knowles' (1975) theory. Candy (1988) offers three meanings to self-directed learning; he sees self-direction autonomy as a personal quality, autodidaxy as learning outside formal instruction, and student-control as an essential consideration of formal instruction.

Self-direction is needed to increase students' autonomy (Laurillard, 1993). Fischer and Sugimoto (2006) assume that self-directed learning is essential to group activity. They also suggest that goals for learning should come from the student, which presumes self-directing competences. Fischer and Sugimoto (2006) argue that self-directed learning activities are present in lifelong learning as well, because acquiring and applying knowledge and competences are made in the context of self-directed learning.

Also Fischer (1999) sees that learning outside the classroom, after graduating, is in the core of self-direction because the skills to learn alone are needed. He sees that the focus of self-directed learning is on dialogs and knowledge-constructing in the group. Mocker and Spear (1982) are also in the same path when they say that self-direction becomes real when students control not only the learning objectives but also the means of learning. So self-direction is about who is in charge; the student is self-directed when he/she is in charge of for example what is learned.

Going through the different definitions of self-direction makes the reader really agree with Grow's (1991/1996) definition of self-directed learning as a kind of exploration of North Pole. Many manage to set their compasses by it but those who define it, manage to shift the meaning to a new location. Grow himself sees that self-direction works in every level of education, it is useful for orientating oneself. He also points out that self-direction has situational features too, for example motivation is seldom equally high among students towards all subjects (Grow, 1991/1996). Grow refers to Vygotsky (1978) when he quotes his phrases of "higher mental function" and "tool of thought" to candidate self-directed learning to fit these phrases.

Grow (1991/1996) sees that students go through four stages while getting more and more self-directed (see table 1 below). Dependent students need the most guidance and explicit directions. They either look up to their teachers as experts or they respond only to teachers who “make” them learn. The role of the teacher is important since he/she can either help or hinder this development. The teacher should match the teaching to the student's stage of self-direction while also supporting the student in reaching the next stage. Grow (1991/1996) actually sees that self-direction is also a situational response, when for example self-motivation is in important role, not only just an attribute which develops through stages.

Table 1. Staged Self-Directed Learning Model (Grow, 1991/1996)

	Student	Teacher	Examples
Stage 1	Dependent	Authority, Coach	Coaching with immediate feedback. Drill. Informational lecture. Overcoming deficiencies and resistence.
Stage 2	Interested	Motivator, guide	Inspiring lecture plus guided discussion. Goal-setting and learning strategies.
Stage 3	Involved	Facilitator	Discussion facilitated by teacher who participates as equal. Seminar. Group projects.
Stage 4	Self-directed	Consultant, delegator	Internship, dissertation, individual work or self-directed study-group.

Table 1 relates to eLearning development since in Web 2.0 students are expected to be on the stages two or even three already from the beginning of the course. If and how they are in those stages is a big question, which needs to be studied. Grow's theory is a candidate for self-direction criteria as well.

Instructional Design is a systemic and reflective process in which principles of learning and instruction are translated to plans for instructional materials, activities, information recourses and evaluation (Smith & Tillmann, 1999).The Instructional Design process described by Smith and Tillmann (1999) and self-direction according to Knowles (1975) have similarities (see table 2 below). It is possible to identify self-directive components in the Instructional Design development process. It may be assumed that the Instructional Designs, which students develop towards their own needs with social media, would make them also take an insight look into themselves. Monitoring and analysing themselves, their needs, and actions can be naturally triggered in design-based learning settings, while using social media tools (Pata & Merisalo, submitted).

Table 2. Comparison of the Phases of Self-direction and Instructional Design Process (Pata & Merisalo, submitted)

Phases for planning	Questions in Instructional Design phases (Smith & Tillmann, 1999)	Components of self-directed learning (Knowles, 1975; Pressley 1995)
DIAGNOSE	Where are we going?	Diagnosing learning needs in the light of the given performance standard
SET GOALS	What are the goals of the instruction?	Formulating meaningful goals for learning
DEVELOP STRATEGY	How will we get there? (What is the instructional strategy?)	Developing and using a wide range of learning strategies appropriate to different learning tasks
SELECT RESOURCES	What is the instructional medium?	Identifying resources for accomplishing various kinds of learning objectives
IMPLEMENT	Instructional design is developed	Carrying out a learning plan systematically and sequentially
EVALUATE	How will we know when we have arrived? (What should our tests look like? How will we evaluate and revise the instructional materials?)	Diagnosing and monitoring performance

According to this design-based model of learning self-direction, learning environment is simultaneously tested and adopted to better meet the needs of the students while developing it. Self-direction becomes evident in this process for the student: the self-directed actions are emphasized also as the activities of developing the Instructional Design. The students have to simultaneously ask the same questions about what they are developing and how they are self-directing their learning. Design-based learning, in which students develop an Instructional Design for aiding their learning, may advance the student's self-direction and prepare them to think design-oriented way (Pata & Merisalo, submitted).

From various conceptualizations of self-direction some candidates for self-direction indicators were selected as relevant. First one was the definition of Knowles (1975) who distinguished self-direction actions: forming through diagnosing needs, formulating needs, indentifying resources, choosing and implementing suitable strategies and evaluating outcomes. Second candidate was selected from the study of Brockett and Hiemstra (1991), who assumed that self-directed learning is a combination of forces inside and outside of the individual, making the individual to take responsibility for decisions associated with the learning process. Also they pointed the social context is important in self-direction. Grow's (1991/1996) explanation of self-direction fits to the chosen candidates. The stage two (see table 1) relates at least partly with Knowles' (1975) "goal setting actions". The stages three and four from Grow's model are similar with Brockett and Hiemstra's (1991) conceptualization of self-direction.

2.2 Self-Reflection

Gillespie (2007) explains self-reflection in three ways. First, it appears in ruptured situations where reflection to one's own arguments is needed since there are several responses to the situation under decision-making. Second, it is present also when it is needed to reflect the sides of the self, which are not so familiar because others give feedback to these sides of the self. Third, self-reflection comes up when personal reflection is needed about the rules and conditions of interaction going on in a group or community.

Self-reflection and self-direction can be seen as related phenomena: self-reflection is a tool for making self-direction visible. Self-reflection is a part of our internal decision-making processes; it is just not so often shared with others. It is a strategy to cope with problems. It is possible to structure the process of self-direction through self-reflection, which reduces the cognitive load (Sweller, 1988) in situations where the human cognitive system needs to process the information.

Self-reflection is bound to self-direction also because thinking and reflecting critically are important elements of self-direction when people need to analyze and judge a problem or situation (Brockett & Hiemstra, 1991). In a way, self-direction also demands that the student has efficacy of self-analysis and self-reflection; the student needs the ability to be conscious of one's own needs and experiences within learning situations.

Kieslinger and Pata (2008) claim that self-directing competences are developed when the student is self-reflecting throughout the whole process of learning. In eLearning 2.0 situations various individual and group goals might collide, and because of this, the goals, and planning to reach the goals need to be continuously monitored. Kieslinger and Pata (2008) also found that there can be a negative impact to a student's creativity from the group mates' self-reflections. The usage of social software also makes it easy to keep on track of the earlier reflections, to plan activities beforehand, and monitor the self-directed actions (Kieslinger & Pata, 2008). Self-reflection can be done for example in blogs or wikis instead of doing it internally. For example, Grow (1991/1996) sees that using conversational learning diaries in blogs is technologically aiding self-direction. Also Downes (2005) sees blogs as a good way to reflect also about learning, they have a personal voice.

2.3 ELearning in Design-Based Social-Software Environments

ELearning 2.0 resides on self-manageable social media tools, learning in personal spaces, depending on and developing the personal identity through the community identity, and continuous invasion to new spaces. These aspects, as well as the before-mentioned distribution of one's personality between spaces, require a lot of self-direction. Design-based courses require self-direction, but, on the other hand, the design process at cognitive and metacognitive level also attributes to the development of self-direction and self-reflection habits (Pata & Merisalo, submitted). Although individual by nature, self-direction and -reflection that are performed in open social environments become part of the group tools; they aid mutual understanding of the learning environment and how to achieve the goal(s).

Design-Based Learning is defined as an educational model where the aim of the study program is at learning to design (Wijnen, 2000). According to Wijnen, the focus of Design-Based Learning is in the underlying design processes even though it is also important that the type of education has emphasis on products that are created within the framework of education. Terms to characterize Design-Based Learning are integrative, going beyond individual disciplines, multidisciplinary, practice-oriented, creative, leading to differentiation, co-operative (teamwork), motivating, competence-oriented, furthering creativity, activating, fostering responsibility, synthesizing in a creative way, and leading to professionalization (Wijnen, 2000). Design-oriented learning mixes understanding of explicit design parameters and conducting conscious and yet implicit creative activity; it is a unique approach of a

combination of objectivism/behaviourism and constructivism (Ning, Williams, Slocum & Sanchez, 2004).

Students need to be independent and take responsibility for the given freedom and autonomy. For example, the freedom to choose the most appropriate tools to use or create personal learning spaces prompts decisions that the students need to handle by themselves. Students also need the capability of processing information effectively, and to know their abilities and competences in order to be self-directive, especially when using Web 2.0 tools and services.

2.3.1 Activity Theory in Group Working

Activity theory by Engeström (1987) presents a triangle model (see figure 1) which is the simplest structure that preserves unity and integral quality of any human activity. Any activity is analysed by its inner dynamic relations and historical change. The triangle model helps to identify the deep-seated contradictions when performing an activity. These contradictions can be seen as conflicts within an activity system in the surface level. The contradictions in the activity system are the sources of learning and development according to Activity Theory.

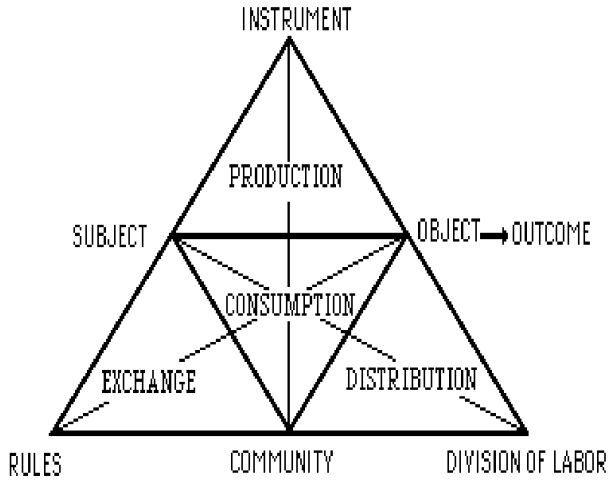

Figure 1. Expansive Triangle (Engeström, 1987)

Activity is a system in which all the elements are related to one another. For example subject and object (objective, goal) have the relation that is mediated by instruments and tools. Rules (or norms and constraints) and the division of labour in the community mediate how subject(s) in the community achieve their objectives. Also, self-direction is a tool that the subjects use for achieving goals in the activities. Reconstruction of various tools (software,

team-members, or self-direction) takes place throughout the activity. The uneven and discontinuous development is driven by different contradictions within the activity system. Some members of the community begin to question the community norms when the contradictions continue over a period of time. In an activity the active subject(s) must understand the object of the activity in order to find the tools. This presumes the common ground upon what is the shared objective. Some students might not even recognize there is an object at the course (Engeström, 1987).

Engeström's theory raises the tools used by a group in an important role. The tools are indispensable for the subject to create or get to the object, fulfil the action. It is also about community as a tool to achieve something. Self-direction is needed to get the learning activity going, for example, setting goals, identifying resources, implementing and also for working inside a group. Working in teams, in collaborative learning environments, as well as in personal learning environments, would force the students to take an insight look into themselves and also to discover the most usable tools. The tools are important since the students can monitor themselves within their teams and analyze their needs and actions (Pata & Merisalo, submitted).

When self-direction is added to this model of an activity, it can be said that the result of the whole activity as a learning opportunity would be an observed change. Namely, Harri-Augstein and Thomas (1991) have said that learning is an observed change, which means that conclusions rise from noticing a change in the self or in others; a change in thinking, perceiving or doing. This observed change is also a kind of feedback loop in the activity system which triggers students to be more self-directed if the change in the state of knowledge was not observed.

The Activity theory framework provides an explanatory scheme for certain indicators of self-direction and their interrelations in the learning situations. It is possible to view self-direction and directing the group as tools to achieve objectives of learning besides using various social media tools. The expansive triangle may serve as a visualization to explain some interrelations of the usage of self-direction indicators during design-based learning.

3 Methodology

3.1 Target of the Study

The EMIM (European Master of Interactive Media) eLearning course, held in spring 2008, was used as a test-bed to develop self-direction indicators from students' reflective posts, and to test the usability of these indicators for explaining self-direction in this course. The eLearning course, coordinated by Tallinn University, took place as part of an international master course of EMIM curriculum. The course design principles were developed and validated in the frames of the IST (Information Society Technologies) 6th Framework project iCamp (Web reference)[1].

3.1.1 Course Outline

The course was developed and run as the third case study of the iCamp-project. It lasted 14 weeks and gave the students 5 ECTS points. The course aimed to develop students' understanding of the principles of planning eLearning courses and offered a design-based approach for getting familiar with the theories and course design methods. It was aimed that the students would develop practical competences of setting up, implementing and evaluating the distributed set of integrated eLearning systems and tools while planning the eLearning course prototype. As part of individual learning assignments, students created or used an existing blog to write their weekly reflections about the work process using a reflection template. The main task for students was to plan an eLearning course in groups in distributed social media settings. The course took place in an extended distributed Web environment consisting of EMIM Moodle for distributing the learning resources and a variety of social media tools that were used for the actual coursework tasks and activities, personally and in groups. One central place for the course was the blog of the facilitator that mashed the students' blog feeds for monitoring purposes.

3.1.2 Weekly Tasks

The following tasks were conducted by students:

Week 1: Individual work, assembling PLE.

Week 2: Forming the groups. Assembling group environment.

Week 3: Group work, preparing the group work for prototype development.

[1] http://icamp.eu

Week 4: Group work, preparing the group work for prototype development.
Week 5: Individual work, creating a personal learning contract.
Week 6: Group work, networking for learning about eLearning courses.
Week 7: Group work, finding/composing learning environment for the prototype.
Week 8: Group work, planning and preparing materials for the prototype.
Week 9: Individual work, peer-reviews of the personal learning contracts.
Week 10: Group work, preparing the description of the prototype.
Week 11: Group work, developing formative evaluation plans for the prototype.
Week 12: Group work, analysing the outcomes of the prototype evaluation.
Week 13: Individual work, self-evaluating the personal learning contract.
Week 14: Individual work, reflecting on the course, and students' own goals.
There were also individual reflective assignments every week that formed the actual target of this thesis.

3.1.3 Sample: Course Participants

The participants of the eLearning-course came from different countries, from 10 universities. Most of the students were MA students but there were some BA and PhD students as well. A total of 77 students enrolled on this course, but 55 used the reflection template at least once. Final sample for analysis the consisted of the 55 students' reflective postings who wrote weekly about their learning experiences. 14 students reflected only during first week, but 74,5% of the students reflected more than one week. 45,5% of the students reflected also after the half-way of the course and 34,5% in the last three weeks.

From the 77 students, 15 posted to their blogs 1-3 times, four just created the blog but never wrote in it, and one posted several times and participated the whole course, but never used the reflection template. Since this study was to be done according to what the students reflected while using the reflection templates, only the blog posts with reflection templates were taken into consideration, and other posts were not used in the final dataset.

3.2 Gathering the Data

The data was gathered from the students' blogs, from the weekly reflection templates. Each template consisted of the following questions:
1. What was the most important thing you learned this week?
2. What was particularly interesting/boring this week?

3. Was there something you did not quite understand and want to know more about it?
4. What kind of questions/ideas/experiences this week's activities raised for you?
5. Which tools did you use this week? Explain what was the purpose of using these tools (e.g. social talk, to regulate my team activities, to work on my documents)?
6. With whom did you communicate during this week, how many times, with which tools, and for what purposes?

The answers to the questions of the template were copied to the Excel files from each student's blog. Each student's data was put to one Excel sheet and one the responses were organized so that the reflection template questions were in the first column, the answers were in rows and weeks in columns.

3.3 Categories

Aiming to find indicators of self-direction, eight categories were created. These categories were used for categorizing the presence of self-direction in the students' blog posts. For these categories subcategories were created, and the final set of categories consisted of 24 indicators of self-direction.

Each student's Excel file was carefully read and the phrases that indicated any subcategory were marked straight to the file with an abbreviation of the subcategory. These abbreviations were also collected into new Excel files with students' names in the rows of first column, the category name in the first row, weeks in columns in the second row and the abbreviations in other rows. This way a summative matrix was created for each category.

The table presenting the categories and subcategories was composed based on theoretical considerations, and modified using the content analysis of the students' reflections. During the process of analysis, the subcategory of “Tools were easy to use” was removed since none of the students mentioned that the tools were easy to use. The second subcategory, “Tools were hard to use” was united with the first category, “Tool Usage”, and named “Difficulties in using tools”. This was done before the quantitative analysis of the results was started. The categories of self-direction indicators are presented and explained more in detail in chapter 4.1.

3.4 Analysing Methods

One binary matrix was created from the Excel files, which presented the appearance of each subcategory in each student's blog posts. The matrix has the students' names in the rows of the first column, the category sub-parts in columns and binary (0/1) in rows indicating whether the student wrote anything to fit the category or not. This way the presence of the subcategory each week for a certain student was indicated in columns.

The binary data was used for descriptive statistics (mean, percentages) to analyze the weekly development in respect to the use of self-direction indicators. New matrixes were created, for example, the weekly frequencies of each category were presented in columns. Also figures were created (using MS Excel), which showed, for example, the weekly progress inside the categories.

The binary data was also put to SPSS in order to do Paired Samples T-Tests for testing the weekly progress. Pearson correlation analysis was conducted with the matrix of self-direction indicator frequencies per weeks. The Pearson correlation analysis was performed to demonstrate interrelations between categories.

4 Results and Analysis of the Data

4.1 The Descriptors of Self-Direction in the Students' Blog Responses

In this chapter the categories of self-direction are presented, and it is also explained why they are pedagogically suitable to indicate the presence of self-direction. Some of the categories were found when examining the theories of self-direction, and some of the categories rose from the qualitative analysis of the dataset.

The selected categories were to fit into the circle of eLearning, which was developed in this thesis (see figure 2) in order to be chosen as the indicators of self-direction for this study. In the first stage of this circle, the ruptured situation must appear in the learners, or exist in the learning surroundings. In this stage the student may feel uncertain about the tools, course elements, or may notice the dissonance between the various viewpoints about the issues they have, or that exist in the group. Different kinds of ruptured situations will put pressure to the student and make him/her find tools to change the situation into more favourable one in order to realise the goal-directed actions. Thus, the student must find tools to mediate their activity. The tools can be, for example, an actual software tool or the group as a tool. The use of these tools helps the student to use self-direction, and the student will start working with different strategy methods in the second stage.

Self-directed action is the tool that people use both in individual and group activities to achieve the goal. If the goal is to be achieved through collaborative assignments, then it is essential to make the team to work as a tool for self-directing one's work. If this is achieved in the third stage, the group is able to work well together. They will get the work done and achieve the goals. If the goal is achieved in this stage, the student may start to understand that he/she has learned something, thus, an observed change will occur in stage four. Then it is possible to get out of the circle and reach the objective, the outcome. However, in some cases; if the person is not good in self-directing, if they cannot manage the software or if the team does not function well, learners might be led back to the ruptured situation stage and the circle will continue.

The voice of the writer may change when learners do individual or collaborative assignments. This circle is proposed as a general model to how self-directed learning might function in

individual and collaborative assignments of eLearning courses. Categories fitting to this circle are presented next in more detail.

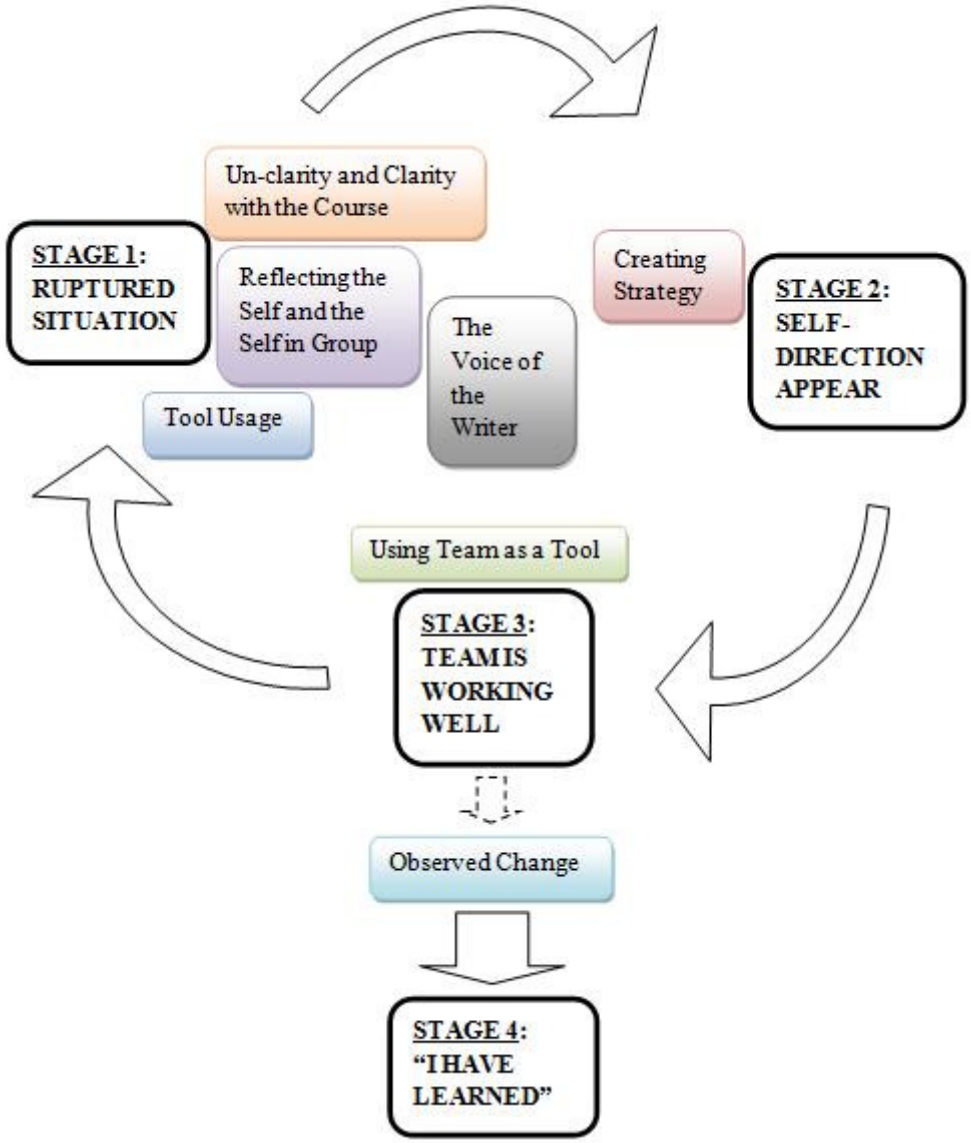

Figure 2. Circle of eLearning and categories of self-direction developed in this thesis

4.1.1 Tool Usage

The first category (see Table 3) is about using social media tools as mediators of self-directed action. The following five subcategories were identified. "Using new tools" means that the student is using new tools in the course. Some of the tools might have been familiar to him/her before but the student did not mention that. "Using same tools" means that the student is using the same tools as at previous week(s). "Stopping to use some tools" means that the student has stopped using some tools, or he/she just did not mention some tools anymore, or he/she mentions the tools left out by names. "Starting to use again some tools"

means that the student starts to use again some tools he/she used some previous week. “Difficulties in using tools” means that the student had difficulties in using some tools.

Table 3. Category: Tool Usage

Subcategory name	*Meaning*	*Explanation*	*Example*
UNT	Using new tools	Student starts to use new tools	"In my work I never used those tools --" "I used blog to create my personal page and scuttle to bookmarks for links." (Adelina)
UST	Using same tools	Student uses same tools	"GoogleDocs (collecting materials for our course), Ning (conversation inside group), MyUdutu (course “playground”)." Vedran (same text seven weeks)
STUST	Stopping to use some tools	Student stops using certain tools	The student does not mention in his/hers list of used tools one or more of the tools anymore.
STUAST	Starting to use again some tools	Student starts to use some tools again	The student mentions in the list of used tools one or more tools that he/she had used before but not in previous week(s).
TWH2U	Difficulties in using tools	The student had difficulties in using tools	"In my work I never used those tools and I had some problems to start working with them." (Adelina)

Tool use was raised as a category to indicate self-direction since ability to use various software reflects the individual's independence and freedom to choose tools to realise their goals individually or in the group. A student needs to understand the functionality of a tool to be able to use it, and to finally choose the tool, which suits the best for the situation that the student has detected. The more familiar the student is with the tool(s) he/she uses, the easier it is to be self-directed or to do teamwork. Difficulty with the tools most commonly occurs when the tools are not familiar to the student and especially when the student is not so experienced with using computers or tools found in the Web.

Using tools also reveals information about the group the individual is participating in. In team situations, the students might drop some tools in order to work in a group; some tools work

better with the group than others, and the students have to follow the decisions of the group. In some cases the groups start to use one tool after voting or the decision of the leader but then notices that it does not work. Then the students get a new change to recommend the tools they are familiar with or see useful in the situation at hand. Using all the tools in a certain course that the student is used to is often too much of a workload and can be confusing. Having all the group members using the same tool(s) for the group work is more convenient.

There is a methodological trend in eLearning 2.0 of using social software in design-based courses. First, personal learning environments are initiated, and then combined with those of the other learners in order to realise group assignments and do the joint learning activities (Tammets, Väljataga & Pata, 2008). In this process each individual is changing and expanding their personal learning environments; integrating new tools, resources and people. Individuals are also suppressing the usage of some tools for the sake of the shared learning environment to be formed. The components in these learning environments, both in personal and in collaborative, are changed during the learning process in order to better meet the needs of learners. (Pata & Merisalo, submitted). The tool use category provides indicators for understanding if the personal and collaborative learning environments are stabile or changing.

The Activity Theory by Engeström (1987) raises the tools used by a group into an important role as mentioned in chapter 2.2. Without tools as mediators of action it is impossible for the subject to get to the object and finally to the outcome. In general, this is why tools are extremely important in a learning process. Instructional Design by Smith and Tillmann (1999) and self-direction by Knowles (1975) overlap in a way as presented in chapter 2.1. Tool usage is brought up while the learner needs to monitor and analyze him/herself and plan what requirements are connected with each toolset and which actions can happen with these tools.

4.1.2 Un-clarity and Clarity of the Course

The second category (see Table 4) is about un-clarity and clarity of the course. The following 2 subcategories were identified: “Un-clarity of the course” means that the student is having difficulties in understanding what the course is about what he/she should do. “Course is clear” means that the unclear situation is fixed and the student knows what the course is about.

Table 4. Category: Un-clarity and Clarity of the Course

Subcategory name	*Meaning*	*Explanation*	*Example*
UWC	Un-clarity of the course	The student seems to be lost with what to do at the course	"This course is been very hard for my, I'm lost and I don't really know how to participate --" (Nuria)
CIC	Course is clear	The unclear things get clear	In this week all my obscurities were explained. (Katarzyna)

If the student has un-clarities about the course he/she does not feel him/herself in charge of the situation and learning, most likely the student might feel uncertain what to do. The student will become a more dependent learner if the course environment is extremely pre-organised and structured by the teacher, and because of that the student may not be so self-directive (Grow, 1991/1996). When the un-clarities are solved, the student will again feel sure about him/herself and the learning process, and can also be more self-directive. To some students un-clarity can be a trigger to be more self-directive and find out issues that can help them to clear the situation. Some other students may get "locked" if they face unclear situations, and they would need the help of the teacher or other students to activate themselves again. Un-clarities can also make some students to drop the usage of certain tools and make them try out other tools and procedures to clear the situation.

The whole learning process in design-based courses with social media is highly challenging and not structured in details in advance, when learning begins. Pre-planning of course tools, resources and activities is hard since in this new eLearning 2.0 instructional design learners determine the nature of learning and the resources that they need. Participating in the design process for the first time can be difficult to some students and may leave many aspects unclear for them (Pata & Merisalo, submitted).

4.1.3 Reflecting the Self and the Self in Group

Category three (see Table 5) is about the student's reflections of the self and the self in group. The following two subcategories were identified: "Reflecting new and old knowledge" means that the student has two different internal voices; he/she observes the different situations, and new and old knowledge. "Noticing a change in the self in a position in group" is about whether the student notices a change in his/hers position in the group.

Table 5. Category: Reflecting the self and the self in group

Subcategory name	*Meaning*	*Explanation*	*Example*
DVS	Different voices of the self, reflecting new and old knowledge	The student has different internal voices, for example, he/she sees what he/she does not know but also realises what he/she can do	"I had a blog before but now I know how to use it to make my life easier." (Anna K)
NCPG	Noticing a change in his/hers position in the group	The student notices that there is a change in his/her position in the group, maybe some un-clarity	"I didnt know what was my exact task to this week so that caused some troubles." (Johanna)

The theory of Gillespie (2007), presented in chapter 2.2, is one basis of this category. The first part of the theory is about individuals having more than one response to the situation under decision-making. These ruptured situations become more visible when the learner self-reflects on the different voices. Noticing difference between old and new knowledge or noticing a difference in knowledge at group level can be indicators of such ruptured situations. The second aspect attributes to the feedback from others on the sides of the self that the individual is not aware of. This may also trigger the learner to self-reflect upon these sides as well.

The third part of Gillespie's (2007) theory was about how the reflection upon the rules and conditions of the present interaction in groups leads to personal self-reflection. Conversations with others or with oneself are powerful tools to make our thinking clearer; they enable us to formulate our responses clearly to the ruptured situations (Pata & Merisalo, submitted). Both individual self-reflecting in problem situations and learning in social settings are providing conditions for these ruptured situations and also to self-directed actions.

As Brockett and Hiemstra (1991) say, self-directed learning is a combination of forces inside and outside of the individual, making the individual to take responsibility for decisions associated with the learning process. This category also indicates self-direction since self-reflection can be seen as a tool to make self-direction visible.

4.1.4 Creating Strategy

Category four (see Table 6) is about activities, which indicate the student's self-direction. The following eight subcategories were identified: “Diagnosing the situation” means that the student diagnoses for example what he/she does not know. “Setting goals” means that the student sets up goals, which he/she want to achieve. “Formulating needs” means that the student formulates the needs, identifies the objective. “Identifying resources” means that the student identifies all the possible resources he/she needs in order to achieve the goals. “Finding strategies” is about the student finding strategies to stay on top of things and get to the goal. “Creating agenda” means that the student creates a time frame, an agenda, for the learning process. “Implementing strategy” means that the student implements a strategy in order to get to the goal. “Evaluating the outcome” is about the student evaluating the outcome of the learning process and used strategies.

Table 6. Category: Creating Strategy

Subcategory name	*Meaning*	*Explanation*	*Example*
DS	The student is diagnosing	The student is diagnosing what he/she does not know, cannot do	"I know that I must be more active with my group." (Johanna)
SG	The student is setting goals	The student set up goals for him/herself	"I want to know more about this and I want that all new things become clear during the course." (Anne K)
FN	The student is formulating needs	The student formulates the needs, identifying the objective	"I have an idea how environment for group work should look like and what types of tools can be integrated in order to provide necessary functionalities." (Korneliya)
IR	The student is identifying resources	The student is identifying resources needed	"I’ve been searching our course material through Google and through SN as well." (Olga)
FS	The student is finding strategies	The student finds strategies to cope	"How we would do it in a traditional way (presential), with which resources, and how I would translate these resources and contents to a eLearning enviroment." (Jose)

CA	The student is creating an agenda	The student made an agenda	"The next step is to name the topic, see what we have and take a decision. Then, we should delegate responsibilities, to each member will have a task specifically. " (Nieves)
IS	The student is implementing	The student is doing things to get to the goal	"I searched some information about the photographing history and learned a bit from that material." (Johanna)
EOS	The student is evaluating the outcome of the strategy	The student evaluates whether he/she succeeded or not	"It was surprisingly hard and difficult to find suitable material from the internet. The biggest problem was that there are so much stuff in the internet so there was plenty of search results." (Johanna)

Knowles (1975) suggests that diagnosing, formulating needs, identifying resources, choosing strategy, implementing and evaluating the outcomes are indicators of self-direction. When the student is diagnosing, he/she is going through what he/she does not know or cannot do. Formulating needs is about identifying the objective, and identifying resources is about how to do, what resources to use. Choosing strategy is also about the way the student wants to do the assignment or collaborative task. Implementing is the actual doing, and evaluating the outcomes is the situation when the student looks back what has been done and evaluates how the process succeeded.

Also Lowry (1989) defines self-direction through the presence of active students who are diagnosing, setting up goals and choosing strategies and resources.

4.1.5 Observed Change

Category five (see table 7) is about observed change, in the self or in others. The following two subcategories were identified: “Noticing a change in the self” means the moments the student understands that he/she has done something in a certain way before, and now realises it can be done in a different way too. It is also about how the student realises that something is interesting and usable even if he/she has earlier thought otherwise. “Realising a change in the others” is about whether the student realises changes in others or (dis)improvement inside the group.

Table 7. Category: Observed Change

Subcategory name	*Meaning*	*Explanation*	*Example*
NCS	Student notices a change in the self	The student notices that there was a change for example in his/hers way of doing (starts to use something which wasn't important earlier)	"Well, this week I learned how actually Zoho tools are cool! I didn't imagine Zoho as so powerful until I checked some video tutorials on Zoho creator." (Damir)
RCO	Student realises a change in others	The student notices a change in some of the group members	"I have found the google group is a good way to communicate. I dont know is it the best way but is has improved the discussion inside the group." (Johanna)

As the name of the category already hints, this category lies in the theory of learning as an observed change (Harri-Augstein & Thomas, 1991). In order to observe changes in one's own or somebody else's way of thinking, perceiving and doing, the individual needs to really consciously observe but also reflect. Monitoring and reflecting on changes in him/herself or among team members can be indicators of the observed change. Hermans (1996) says that in the self there is a dialogical interchange going on between relatively autonomous and mutually influencing selves. Self-direction is reached when the individual allows the various positions to be internally voiced.

4.1.6 Using the Team as a Tool

Category six (see Table 8) is about using the team as tool. The following two subcategories were identified: "Expecting others to work" means the student is observing others and noticing if some of the co-students do not work at all or as much as was agreed or as much as the student works him/herself. "Organising the group" indicates to student's activity in organizing the group.

Table 8. Category: Using the Team as a Tool

Subcategory name	*Meaning*	*Explanation*	*Example*

EOW	Expecting others to work	The student sees that the others should do things what he/she does	"The only thing, that I didn't quite understand is why some people from my group have done nothing or only a little, while the rest of it, is working." (Kamil)
OG	Organizing the group	The student tries to organize the team, make it a better tool	"Activating my team, defining roles inside our team, developing better personal and impersonal communication." (Vedran)

In the Activity Theory by Engeström (1987), presented in chapter 4.1.1, the instrument or tool can also mean the group. The subject is using the group as a tool to get to the object; the team is a tool for realising the individual's goals in the group. Indicators of this kind of operationalizing of self-direction can be "Organizing the group" and "Expecting others to work". This theory of Engeström (1987) assumes also that problems are introduced by the perspective of others when the group is in problematic situation. Group members reflect on the conditions and rules of the group interaction creating reflections.

The third part of Gillespie's (2007) theory about the origin of self-reflection fits to this category too. It is about the reflection upon the rules and conditions of the interaction in a group which leads to personal self-reflection. The students expecting others to work or organizing the group are also reflecting upon the often unsaid rules of the joint learning process. Brockett and Hiemstra (1991) bind self-reflection to self-direction through critical thinking and reflecting, the individual analyzes the problems. The group may serve as a tool for the individual to realise his/hers goals in the group; the group is operationalizing self-direction.

4.1.7 The Voice of the Writer

Category seven (see Table 9) is about the way the student writes; whether he/she chooses to use first person or plural ("we", "our" etc). The following two subcategories were identified: "Writing in the first person" means that the student writes in I-form, in first person. "Writing as a part of the group" means that the student writes in we-form, as part of a group, not as individual.

Table 9. Category: The Voice of the Writer

Subcategory name	*Meaning*	*Explanation*	*Example*
WFP	Writing in the first person	The student is writing as "I"	"I have communicated with some participants. In this point I apologize again for being absent." (Javier)
WPG	Writing as part of the group	The student is writing as "I" in the group, using for example "we" and "our".	"Our work has gone 200 mph…we are working at our best capabilities to finish the course in the proper time." (Robert)

The voice, with which the student reflects, is one indicator demonstrating whether the student is focused at him/herself or at him/herself as part of the group when performing self-direction.

Learning is seen as a process developing through dialogue according to a contemporary approach on education (Vygotsky, 1962; Bakhtin, 1986). Understanding is constructed in dialogic interactions with all the parts of the process; peers, teachers and learning materials. The students internalize new meanings from significant dialogues that are developed interpersonally (Vygotsky, 1962).

Socio-cultural approach combines together Vygotsky's account of mediation by tools including words as sign-tools (dialectic), and Bakhtin's account of mediation by the voices and perspectives of others (dialogic). In a dialogue, the voice of the other works as an outside perspective, which includes participants within it. This makes the boundary between subjects an inclusive space where constructing and reconstructing of the self and each other happens (Wertsch, 1994). Wegerif (2006) points out that the main mechanism for learning in dialogic approach is taking the perspective of another in a dialogue. He also emphasizes that the ability to change one's mind and see thing from a new perspective are the issues essential for learning (Wegerif, 2007).

In addition, Bakhtin (1923/1990) says that one can learn oneself from the perspective of other when others give back the view they receive from the self. Others are working as mirrors and provide feedback that the individual can not perceive other ways, unaided.

4.2 The Weekly Development of Self-Direction

In this chapter the results of examining the weekly development of self-direction are presented. The self-direction categories presented in the previous chapter were used to recognize self-direction from the self-reflection posts in the blogs of the students in the eLearning course. The results are presented in each category. Some of the trends occurring in the self-direction categories become clearer when they are explained in the context of the weekly outline of the course. This is why there are short descriptions of weekly outline of the course on the figures of each category.

4.2.1 Tool Usage

From figure 3, it can be seen that the usage of new tools dropped tremendously after the first week. The students obviously tried a lot of tools (some of them totally new to them some possibly familiar from other courses) and then started to make choices on which tools to use and which not. A wide range of tools was presented to them by the facilitators, though some students also tried other tools.

As an example for a typical use of tools, Veera used blogs for the first two weeks, and after that she also used Doodle for the following two weeks. In the fifth week, she added Pollchat to the tools she used. The following week, she got wiki and Scuttle as new tools. In the seventh and eighth weeks, she also used FlashMeeting and FreeMind. In the ninth and tenth week, Bubbleshare was a new tool. Only in weeks eleven and twelve she stopped trying out new tools.

In his first weekly reflection, Dino wrote: *I used skype, email, scuttle and blog for communication with others.* In the second reflection he wrote: *I think the right tool choice can result in simplified creation of our group eLearning course. For now, the best tool I found and I' familiar with it is Moodle. Except this tools I used Skype, Web blog, Scuttle and Wiki.* In the third reflection he wrote: *I used skype to communicate with my group members. I built shared web blog for my group in agreement with my great colleague Mr. Lyubomir. I used many others tools, too (Wikipedia, Scuttle. e-mail…).*

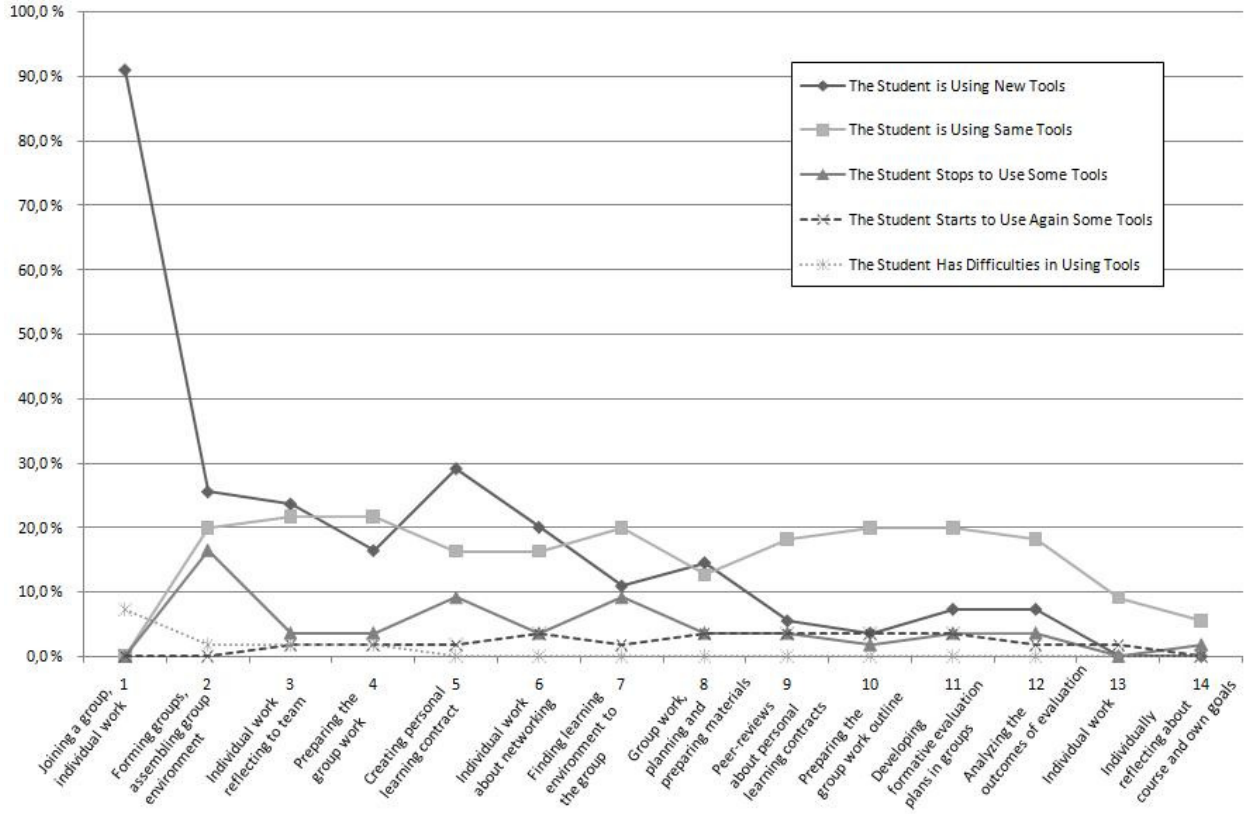

Figure 3. The trend of "Tool Usage" in weeks

The Paired Samples T-Test (see Table 10) also indicates that in subcategory of "Using new tools" there was a strong significant (p=<.001) difference between the means of weeks 1 and 2 and also between weeks 14 and 1. These may be due to the high usage of new tools in week 1 and lower in weeks 2 and 14.

Table 10. Paired Samples T-Test of "Using new tools"

Week pairs	Weeks	Mean	df	t	Sig.
1-2	1	,91	54	9,388	,001*
	2	,25			
2-3	2	,25	54	,227	,821
	3	,24			
3-4	3	,24	54	1,070	,289
	4	,16			
4-5	4	,16	54	-1,993	,051
	5	,29			
5-6	5	,29	54	1,299	,199
	6	,20			
6-7	6	,20	54	1,695	,096
	7	,11			
7-8	7	,11	54	-,574	,568

	8	,15			
8-9	8	,15	54	1,695	,096
	9	,05			
9-10	9	,05	54	,444	,659
	10	,04			
10-11	10	,04	54	-,814	,419
	11	,07			
11-12	11	,07	54	,000	1,000
	12	,07			
12-13	12	,07	54	2,058	,044
	13	,00[a]			
13-14	13	,00[a]			
	14	,00[a]			
14-1	14	,00[a]	54	23,238	,001*

a. The correlation and t cannot be computed because the standard error of the difference is 0.

* The mean difference is statistically significant at the .001 level (2-tailed).

According to Paired Samples T-Test (see Table 11), in the subcategory of "Using same tools" there was a strong significant (p=<.001) difference between the means of weeks 1 and 2. The table indicates that the students reported continuing the use of the same tools with the same intensity, however, in the first week all the tools were new.

Table 11. Paired Samples T-Test of "Using same tools"

Week pairs	Weeks	Mean	df	t	Sig.
1-2	1	,00	54	-3,464	,001*
	2	,18			
2-3	2	,18	54	-,468	,642
	3	,22			
3-4	3	,22	54	,000	1,000
	4	,22			
4-5	4	,22	54	,903	,371
	5	,16			
5-6	5	,16	54	,000	1,000
	6	,16			
6-7	6	,16	54	-,629	,532
	7	,20			
7-8	7	,20	54	1,158	,252
	8	,13			
8-9	8	,13	54	-1,000	,322
	9	,18			
9-10	9	,18	54	-,299	,766
	10	,20			

10-11	10	,20	54	,375	,709
	11	,18			
11-12	11	,18	54	,000	1,000
	12	,18			
12-13	12	,18	54	1,936	,058
	13	,09			
13-14	13	,09	54	1,000	,322
	14	,05			
14-1	14	,05	54	-1,765	,083

* The mean difference is statistically significant at the .001 level (2-tailed).

Dropping some tools (see figure 2) was usual for almost 20 % of the students in the first weeks, after that it decreased in later weeks. In the course, the students must use social software when starting the course. This situation can be confusing and incoherent as there were a lot of new tools. The students seldom told why they stopped using some tools, but quite commonly they stopped using the tools that they felt they did not need for individual or for the group work. For example Daniela, Kamil and Korneliya stopped to use Scuttle.

Some students tried new tools just out of curiosity; for example Jasna obviously tried out some tools for a week and then dropped most of them (for example Pageflakes and Gabbly). Most students tried new tools because their group made a choice to use a certain tool for their group work. For example, Damir stopped using Scuttle, but he also stopped using GoogleGroups, whereas he started to use Wikispaces as the group changed from GoogleGroups to Wikispaces. So tools were dropped also because they did not fit for the group.

Paired Samples T-Test (see Table 12) indicated that in second week, there was a significant (p=<.01) difference in stopping to use some tools; the students used less tools. In other weeks no significant change in dropping tools was found.

Table 12. Paired Samples T-Tests of “Stopping to use some tools”

Week pairs	Weeks	Mean	df	t	Sig.
1-2	1	,00	54	-3,250	,002**
	2	,16			
2-3	2	,16	54	2,182	,034
	3	,04			
3-4	3	,04	54	,000	1,000
	4	,04			

4-5	4	,04	54	-1,137	,261
	5	,09			
5-6	5	,09	54	1,137	,261
	6	,04			
6-7	6	,04	54	-1,137	,261
	7	,09			
7-8	7	,09	54	1,352	,182
	8	,04			
8-9	8	,04	54	,000	1,000
	9	,04			
9-10	9	,04	54	,574	,568
	10	,02			
10-11	10	,02	54	-,574	,568
	11	,04			
11-12	11	,04	54	,000	1,000
	12	,04			
12-13	12	,04	54	1,427	,159
	13	,00			
13-14	13	,00	54	-1,000	,322
	14	,02			
14-1	14	,02	54	-1,000	,322

** The mean difference is statistically is significant at the .01 level (2-tailed).

Based on these results, it can be argued that the students dropped some of their tools for the sake of working in a joint team environment; the group work started on week 2, when also the dropping of some tools was significant according to Paired Samples T-Test. Another thing possibly influencing the dropping of tools was the fact that in the first week, there were a lot of new tools introduced in the course. The students continued to use only the ones that felt useful.

Some students did try new tools also later during the course. One peak was in week five which was about writing a personal learning contract and which was a week after the preparing of group work. For writing a personal learning contract some students tried a new tool, iLogue. Also the preparing of group work made some students try some new tools in order to test and try good tools for the group. For example, Jose wrote in his third reflection: -- *I have been looking for new tools to chat and to share information in real time with my group. I have also tried some of the tools proposed by my group members in order to share information.*

The Paired Samples T-Tests showed no significant differences in categories “Starting to use again some tools” and “Difficulties in using tools”.

The whole table of the category's Paired Samples T-Test is in annex A.

4.2.2 Un-clarity and Clarity with the Course

Figure 4 shows that during the first week, some students felt confused about the course. Some students felt that they were a bit lost and did not quite understand what they were supposed to do and how to contact their group mates. For example Nieves wrote: *I have seen some difficulties in our first week. I think that this new course, new tools, different tasks…are very somethings for people that haven’t got a lot of information about this topic.* Sanna wrote about how the group work was unclear: *I would want to get a bit more clear instructions for our groupwork.*

In week 11, the reflections showing that the course clears up increased while the un-clarity was decreased. In weeks 1, 2, 3, 6 and 11 the students reflected that the course cleared up; the things that were unclear were explained or otherwise made clear.

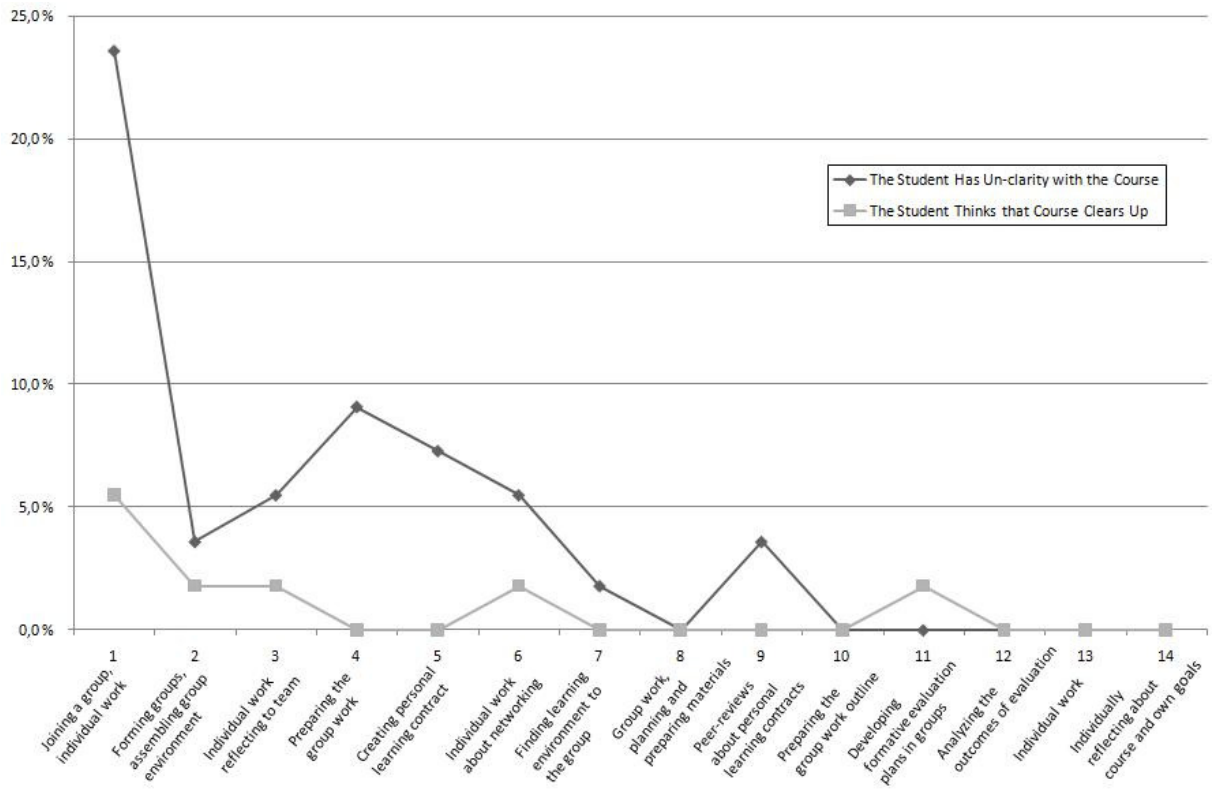

Figure 4. The trend of “Un-clarity and Clarity with the Course” in weeks

Paired Samples T-Tests (see Table 13) indicates that there was a significant (p=<.01) difference in the rate of feeling un-clarity between the first two weeks. In the first weeks more students had un-clarity with the course than in week 2. There was also a strong significant (p=<.001) difference between weeks 14 and 1, indicating that un-clarity dropped by the end of the course. In other weeks no significant change in un-clarity with the course was found.

Table 13. Paired Samples T-Tests of "Un-clarity with the course"

Week pairs	Weeks	Mean	df	t	Sig.
1-2	1	,24	54	3,047	,004**
	2	,04			
2-3	2	,04	54	-,444	,659
	3	,05			
3-4	3	,05	54	-,814	,419
	4	,09			
4-5	4	,09	54	,444	,659
	5	,07			
5-6	5	,07	54	,444	,659
	6	,05			
6-7	6	,05	54	1,000	,322
	7	,02			
7-8	7	,02	54	1,000	,322
	8	,00			
8-9	8	,00	54	-1,427	,159
	9	,04			
9-10	9	,04	54	1,427	,159
	10	,00			
10-11	10	,00[a]			
	11	,00[a]			
11-12	11	,00[a]			
	12	,00[a]			
12-13	12	,00[a]			
	13	,00[a]			
13-14	13	,00[a]			
	14	,00[a]			
14-1	14	,00	54	4,088	,001*

a. The correlation and t cannot be computed because the standard error of the difference is 0.

* The mean difference is statistically significant at the .001 level (2-tailed).

** The mean difference is statistically is significant at the .01 level (2-tailed).

The Paired Samples T-test showed no significant difference in the subcategory “Course clears up”. The whole table of the category's Paired Samples T-Test is in annex A.

4.2.3 Reflecting the self and the self in group

Figure 5 shows how, during the first week, a small amount of the students reflected their old knowledge according to new, or noticed something new. For example, Miki writes: *Earlier I have been trying to find out the intrinsic and extrinsic motivation of students by asking them, but maybe I should try to concentrate more on using these strategies.* This way of noticing a change in the self dropped tremendously after the first week, and disappeared in the last weeks almost completely.

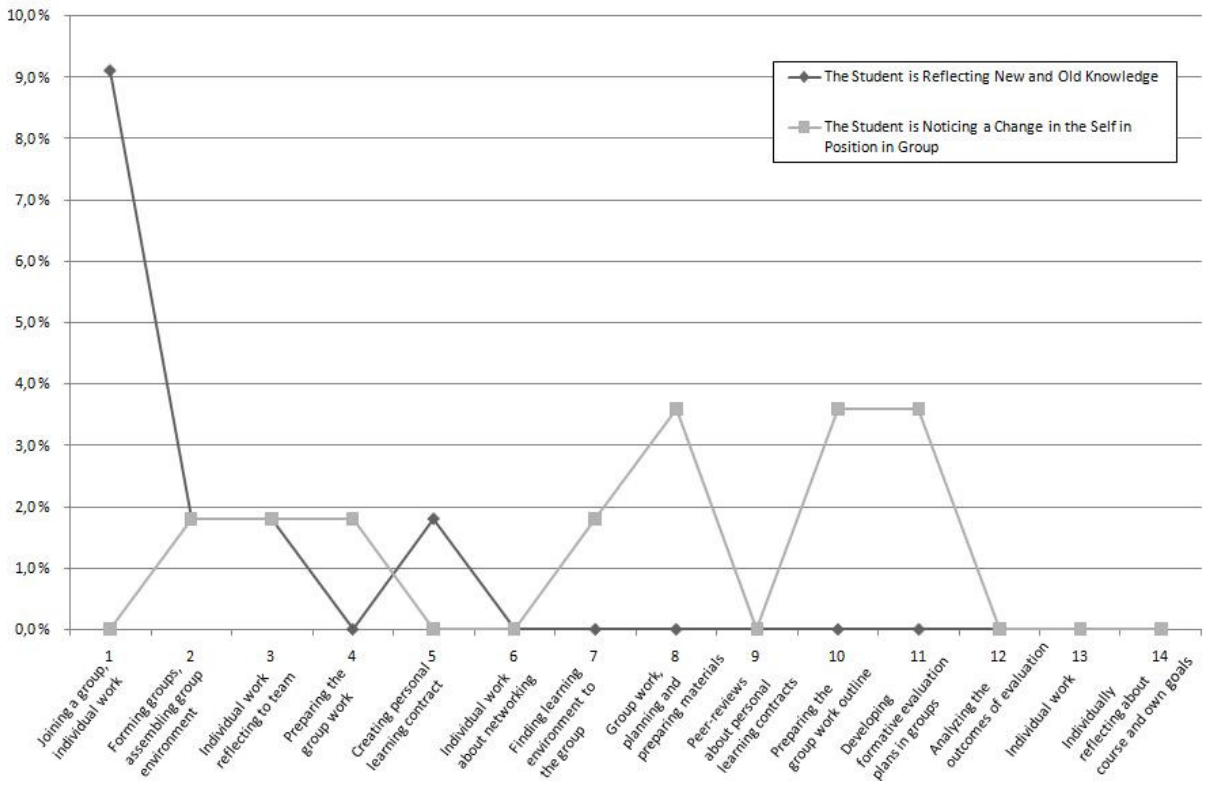

Figure 5. The trend of “Reflecting the self and the self in group” in weeks

Quite seldom the students reflected on a change in the self in a position in the group. The peaks hit to the weeks with a lot of group activity: planning and preparing materials in week eight, preparing the group work outline in week 10 and developing formative evaluation plans in groups in week 11. For example, Dino writes: *This week rised my experiences in teamwork to the new level.*

Paired Samples T-Tests showed no significant differences in this category. The whole table of the category's Paired Samples T-Test is in annex A.

4.2.4 Creating Strategy

Figure 6 shows clearly the trends in the category of "Creating Strategy". In the first weeks the students diagnosed the situation more often than in the last weeks of the course, for example, Oleg writes in week two: *I thing about difficulties of managing groupwork, how many decisions have to be done before starting – arrange roles, meetings, tools and so on*. Also the emphasis of goal setting was in the first third of the course. Formulating needs happened almost throughout the course, as also the identification of the resources. Implementing the strategy started from the half-way of the course, for example, Luisa writes in week nine: *I have been preparing the course prototype and found that I had a lot to do,* and Pavla writes in week seven: *I was looking for information about the content of the course we prepare especially around recycling* --. The emphasis was on the evaluation of the outcome in the last weeks, especially in the last three.

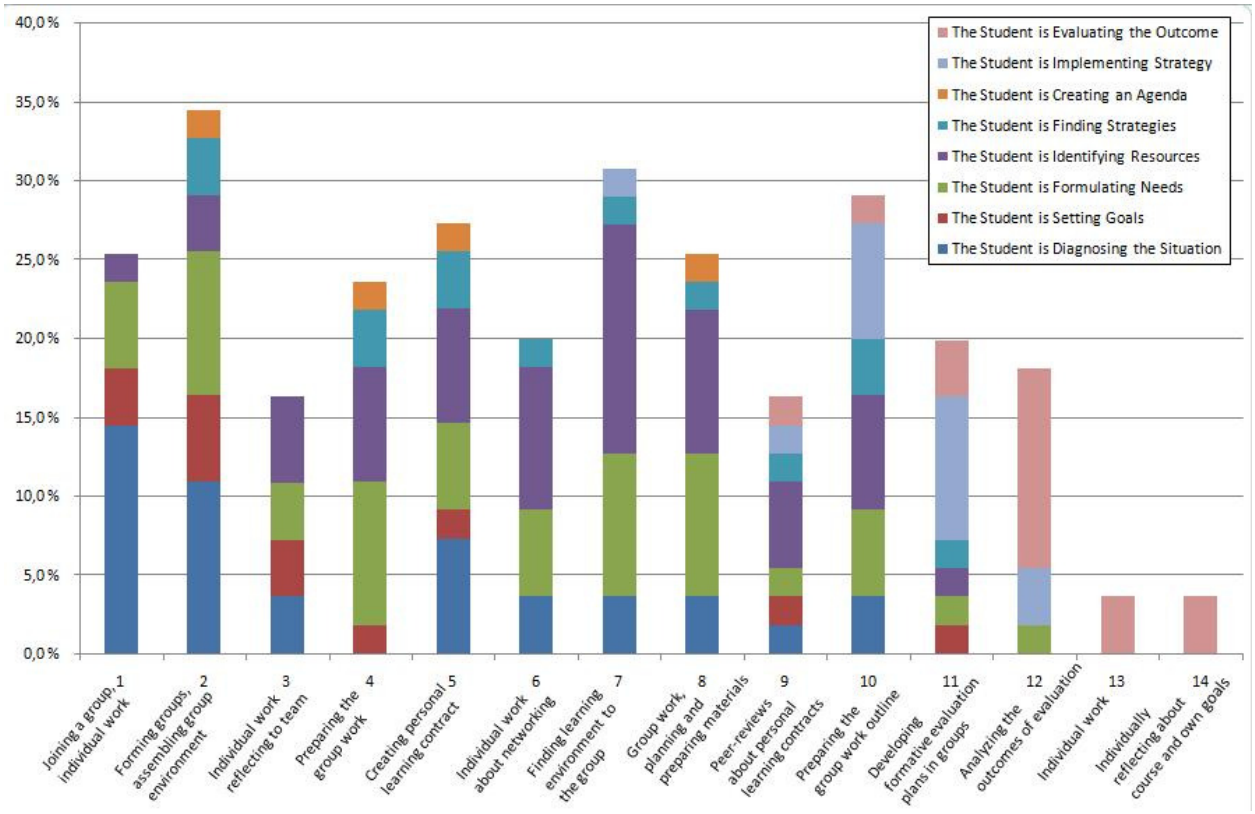

Figure 6. The trend of "Creating Strategy" in weeks

The Paired Samples T-Tests showed significant (p=<.01) difference only in the subcategory of diagnosing the situation and only between weeks 14 and 1. This indicates that quite many students diagnosed the situation in the first week but no one did it in the last week.

Table 14. Paired Samples T-Tests of "Diagnosing the situation"

Week pairs	Weeks	Mean	df	t	Sig.
1-2	1	,15	54	,574	,568
	2	,11			
2-3	2	,11	54	1,427	,159
	3	,04			
3-4	3	,04	54	1,427	,159
	4	,00			
4-5	4	,00	54	-2,058	,044
	5	,07			
5-6	5	,07	54	1,000	,322
	6	,04			
6-7	6	,04	54	,000	1,000
	7	,04			
7-8	7	,04	54	,000	1,000
	8	,04			
8-9	8	,04	54	1,000	,322
	9	,02			
9-10	9	,02	54	-1,000	,322
	10	,04			
10-11	10	,04	54	1,427	,159
	11	,00			
11-12	11	,00[a]			
	12	,00[a]			
12-13	12	,00[a]			
	13	,00[a]			
13-14	13	,00[a]			
	14	,00[a]			
14-1	14	,00	54	3,032	,004**

a. The correlation and t cannot be computed because the standard error of the difference is 0.

** The mean difference is statistically is significant at the .01 level (2-tailed).

The Paired Sampled T-Tests showed no significant differences in other subcategories. The whole table of the category's Paired Samples T-Test is in annex A.

4.2.5 Observed change

Figure 7 shows how the students noticed a change in the self or in others and identified learning to take place. For example, Damir writes in the first week: *I never before used web blogs because I didn't feel some special need to use them.* This kind of writing appeared from time to time during the course: the peaks hit in the beginning of the course, in week four when the preparing of the group work started, and in week nine when there were peer-reviews of personal learning contracts. This indicates that in the beginning of the course the students might get to know other ways to work than what they know from earlier. Preparing the group work possibly raised questions again about other ways to work as a group. Also the peer-reviews have influence.

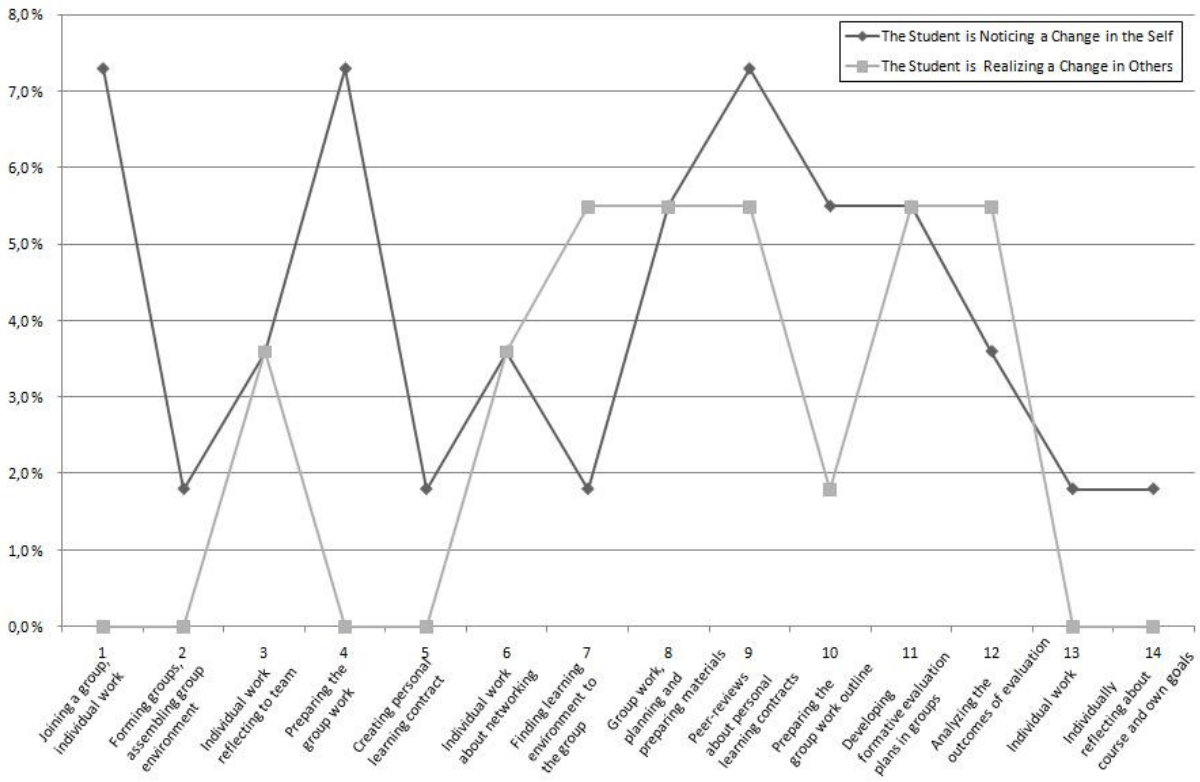

Figure 7. The trend of "Observed Change" in weeks

Some students also reflected on change in the others. These changes were usually about some group mates disappearing. For example, Jasna wrote: *What happend to the half of a team? I mean we had couple of group chat and we agreed about everything, that is to write our visions about our future course, but something went wrong again* and Pavla wrote: *I was surprised that only few members of our group continue in working on the tasks, I was a bit disappointed about it.*

Paired Samples T-Tests showed no significant differences in this category. The whole table of the category's Paired Samples T-Test is in annex A.

4.2.6 Using the Team as a Tool

Figure 8 shows that the highest peak of a student organizing the group was in the first week of the course. The enthusiasm to organize the group was lower in the weeks of individual work (weeks three and six) and was at its lowest in the end of the course.

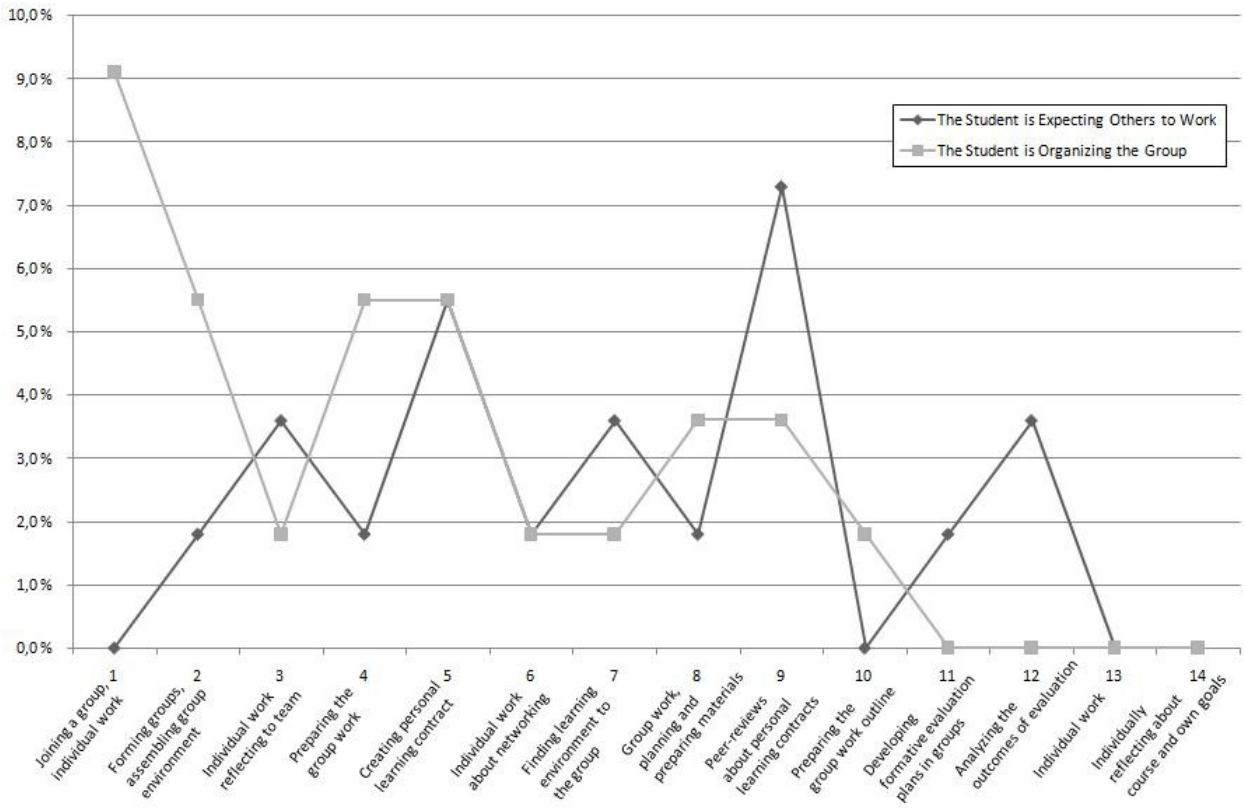

Figure 8. The trend of "Using the Team as a Tool" in weeks

Some students also wrote about how they expected the other students to work. The peak for this was in week nine when there were peer-reviews of personal learning contracts. Maybe during this week some students realised that some others are possibly dropping out since they have not been active with the group. For example, Vedran wrote: *Where is my team?????!!!????* The first peak, though a bit smaller than the above mentioned, also occurred during the week when the subject was writing personal learning contracts. Perhaps this was the first week of the students noticing that others do not work in a group as they should. For example Damir wrote in week five: *I still don't understand why some of group members aren't active enough. I thought that everyone who wished to participate to this*

project should be enough motivated and find some goods from being a part of it. Maybe through working with personal learning contracts makes the students also notice others.

Paired Samples T-Tests showed no significant differences in this category. The whole table of the category's Paired Samples T-Test is in annex A.

4.2.7 The Voice of the Writer

Figure 9 shows how at the beginning of the course, most of the students wrote in the first person and how this way of writing decreased while writing in plural increased. Starting to work in groups increased the use of plural in the style the students wrote. In the last weeks the use of the first person increased a bit in relation to the use of plural. Perhaps at the end of the course the students started to see the course again from an individual point of view when they started to reflect on their experience and do the last individual assignments.

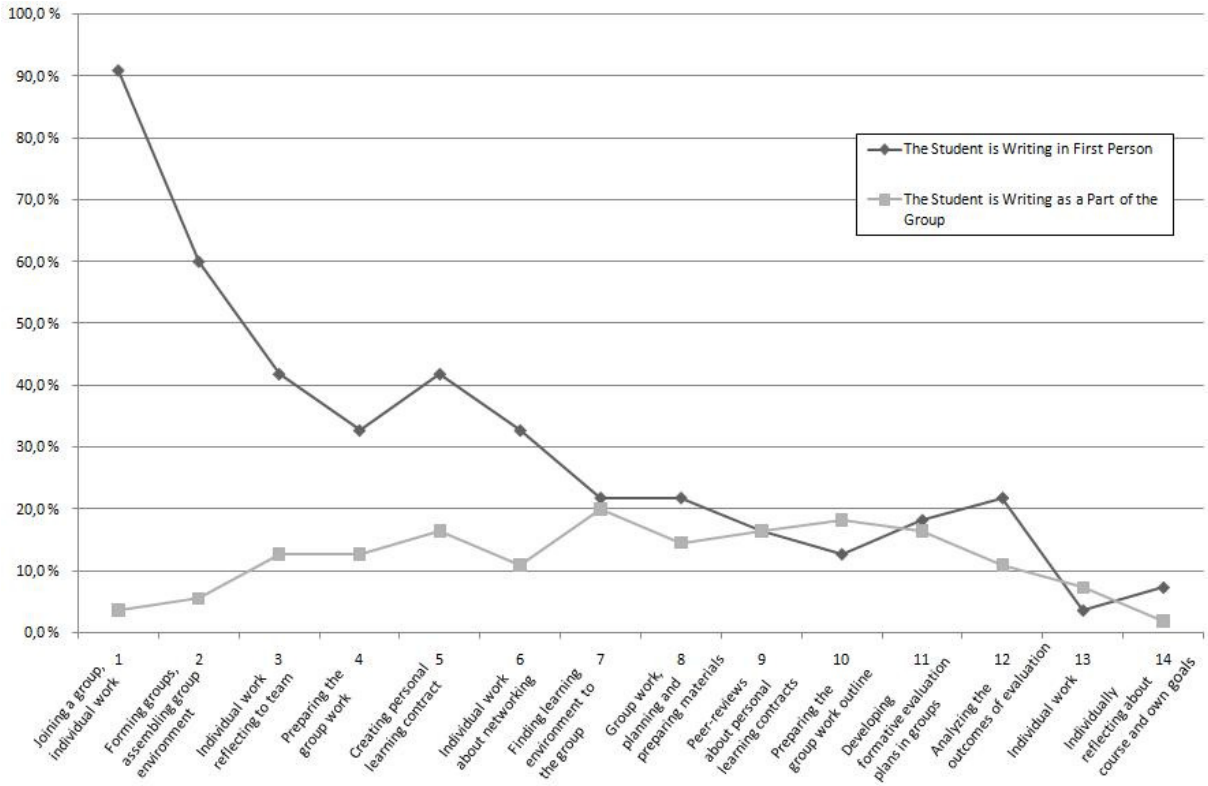

Figure 9. The trend of "The Voice of the Writer" in weeks

Paired Samples T-Test (see Table 15) showed a strong significant (p=<.001) difference in the subcategory of writing in the first person between weeks 1 and 2, 12 and 13 and also 14 and 1. This indicates that between these weeks, the writing in the first person dropped significantly. In the first week most of the students wrote in first person, but in the second

week they started to form groups and perhaps that way started to think a bit more from the group point of view. In week 12, the use of the first person in writing was significantly higher than in week 13.

In week 12, the students analysed the evaluation of their group work and in week they did further individual work. The use of "first person voice" decreased between these weeks though it would have been expected to increase according to the tasks. Perhaps the students made the analysis more individually or the students might have been behind the schedule and actually did the analysis in week 13. Between weeks 14 and 1 the change was also significant according to the usage of the first person; it was much higher in week 1 than in week 14. One important indicator demonstrating whether the student is focusing on himself while performing self-direction or the student perceives himself as part of the group when self-directing, is the reflecting voice.

Table 15. Paired Samples T-Tests of "Writing in the first person"

Week pairs	Weeks	Mean	df	t	Sig.
1-2	1	,91	54	4,245	,001*
	2	,60			
2-3	2	,60	54	2,631	,011
	3	,42			
3-4	3	,42	54	1,218	,229
	4	,33			
4-5	4	,33	54	-1,299	,199
	5	,42			
5-6	5	,42	54	1,299	,199
	6	,33			
6-7	6	,33	54	2,194	,033
	7	,22			
7-8	7	,22	54	,000	1,000
	8	,22			
8-9	8	,22	54	1,000	,322
	9	,16			
9-10	9	,16	54	1,427	,159
	10	,13			
10-11	10	,13	54	-1,352	,182
	11	,18			
11-12	11	,18	54	-,704	,485
	12	,22			
12-13	12	,22	54	3,464	,001*
	13	,04			

13-14	13	,04	54	-1,427	,159
	14	,07			
14-1	14	,07	54	16,613	,001*

* The mean difference is statistically significant at the .001 level (2-tailed).

The Paired Samples T-Tests showed no significant differences in the subcategory "Writing as a part of the group". The whole table of the category's Paired Samples T-Test is in annex A.

4.3 The Interrelations between Self-Direction Categories

In this chapter the results from examining the interrelations between the self-direction categories are presented. With Pearson correlation analysis (see Table 16) statistically significant correlations between some variables were found. The labels are written in the first row and the numbers in first column refer to the numbers in brackets after the label.

Table 16. Pearson Correlation Coefficient Table

Self-direction indicators	Using New Tools (1)	Using Same Tools (2)	Stops to Use Some Tools (3)	Starts to Use Again Some Tools (4)	Difficulties in Using Tools (5)	Un-clarity with the Course (6)	Course Is Clear (7)	Refl. New and Old Knowledge (8)	Noticing a Change in the Self in a Position in Group (9)	Diagnosing the Situation (10)	Setting Goals (11)	Formulating Needs (12)	Identifying Resources (13)	Finding Strategies (14)	Creating an Agenda (15)	Implementing Strategy (16)	Evaluating the Outcome (17)	Noticing a Change in the Self (18)	Realising a Change in the Others (19)	Expecting Others to Work (20)	Organizing the Group (21)	Writing in the First Person (22)	Writing as a Part of the group (23)
1																							
2	-.48																						
3	-.02	.46																					
4	-.44	.46	-.25																				
5	.92**	-.49	-.13	-.54*																			
6	.94**	-.44	-.12	-.42	.91**																		
7	.87**	-.43	-.05	-.30	.86**	.74**																	
8	.96**	-.58*	-.09	-.53	.94**	.90**	.87**																
9	-.22	.45	.11	.43	-.17	-.33	-.10	-.25															
10	.85**	-.33	.36	-.45	.73**	.72**	.72**	.83**	-.10														
11	.56*	.08	.48	-.46	.61*	.52	.60*	.57*	.01	.65*													
12	.29	.30	.54*	-.01	.20	.24	.07	.11	.42	.44	.25												
13	-.04	.44	.33	.39	-.21	-.03	-.23	-.21	.33	.08	-.18	.72**											
14	-.11	.55*	.56*	.25	-.21	-.07	-.27	-.23	.41	.15	.17	.62*	.50										
15	.09	.20	.55*	-.12	.00	.07	-.19	-.03	.22	.25	.31	.65*	.25	.65*									
16	-.31	.35	-.14	.49	-.27	-.37	-.08	-.26	.55*	-.30	-.20	-.23	-.10	.16	-.37								
17	-.35	-.00	-.24	-.00	-.27	-.38	-.26	-.25	-.23	-.46	-.36	-.57*	-.58*	-.43	-.37	.37							
18	.31	-.01	-.45	.36	.40	.43	.29	.27	.24	.04	.12	.11	.01	.09	-.01	.24	-.11						
19	-.32	.41	-.04	.65*	-.40	-.41	-.19	-.38	.31	-.37	-.32	-.02	.32	-.17	-.31	.41	.27	.19					
20	-.14	.48	.34	.28	-.29	-.08	-.29	-.20	-.22	-.08	.12	.01	.31	.17	.11	-.06	.02	.04	.47				
21	.81**	-.22	.27	-.31	.79**	.85**	.58*	.70**	-.16	.88**	.64*	.57*	.17	.34	.51	-.41	-.55*	.41	-.41	.07			
22	.93**	-.28	.26	-.55	.87**	.86**	.83**	.88**	-.16	.89**	.75**	.42	-.01	.04	.25	-.34	-.37	.21	-.34	-.04	.83**		
23	-.35	.67**	.12	.74**	-.48	-.32	-.43	-.43	.49	-.28	-.28	.27	.68**	.46	.03	.48	-.12	.18	.59*	.53*	-.15	-.34	

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
r = Pearson correlation

The statistically significant correlations at the 0.01 level are discussed in the following chapters.

4.3.1 Tool Usage

The subcategory of “Using new tools” had statistically significant correlations between with seven other subcategories (see table 16). It correlated positively (r=0.92) with “Difficulties in using tools” and from that it can be articulated that using social software was not easy when the tools were new to the students.

“Using new tools” correlated positively also with “Un-clarity with the course” (r=0.94) as well as “Course is clear” (r=0.87) which was interesting. This indicates that using new tools is not a universal reason for un-clarity with a course since some of the students used new tools while the course cleared up for them. It is, however, important to realise that for some students using new tools and un-clarities with the course go hand in hand; using new tools might even cause some of the un-clarities. “Using new tools” correlated positively (r=0.96) with “Reflecting new and old knowledge”, indicating that at least some students reflected new and old knowledge about the tools they used. The students were using new tools and reflecting on new and old knowledge in the same time.

“Using new tools” had a significant positive correlation (r=0.85) with “Diagnosing the situation”. This indicates that students were using new tools while they diagnosed the situation. Also with “Organizing the group” there was a positive correlation (r=0.81) from which it can be argued that some students used new tools while organizing the group. The new tools might have been noticed worthwhile to try out or even that some students preferred to choose new tools instead of some old ones they knew. The students who were organizing the group might have suggested new tools for the group to use while organizing it. The last significant, positive correlation was between “Using new tools” and “Writing in the first person” (r=0.93). This indicates that some students were still in the phase of looking the course from their own perspective instead of looking from the group point of view while they used new tools.

The subcategory “Using the same tools” of the category “Tool usage” had statistically significant correlation only in one place. “Using the same tools” had positive correlation (r=0.68) with the subcategory “Writing as a part of the group”. However, “Writing as a part of the group” had significant correlation (r=0.74) also with the subcategory “Starting to use again some tools” (which was the only statistically significant correlation “Starting to use again some tools” had). This could indicate that when the students started to work as a group,

they kept using some particular tools and started to use again some tools, which they had tried out earlier. Group work can be seen to trigger such use of tools.

The subcategory “Stopping to use some tools” of category “Tool usage” had no statistically significant correlations with any other subcategory. Instead, the subcategory “Difficulties in using tools” from the same category had statistically significant correlations with seven other subcategories. One was with “Using new tools” which was presented earlier. What was interesting was that “Difficulties in using tools” had significant positive correlation with “Un-clarity with the course” (r=0.91) and “Course is clear” (r=0.86). This again indicates that there is no universal relation that could indicate that difficulties in tool usage have only to do with un-clarity and difficulties of understanding the course. Some students have difficulty in using tools even when the course is clear in other ways.

The subcategory “Difficulties in using tools” had significant, positive correlation (r=0.94) also with “Reflecting new and old knowledge”. This could indicate that while students were in the process of reflecting their knowledge, they in some level reflected also about the knowledge of the tools they had used. Some might have noticed that he/she had difficulty in using some tool and would have preferred to use some other tool he/she had knowledge about. “Difficulties in using tools” correlated significantly (r=0.73) also with “Diagnosing the situation”. This might suggest that the students also analysed the usage of the tools while they diagnosed the situation they had with knowledge and the course.

“Difficulties in using tools” had also a statistically significant, positive correlation (r=0.74) with “Organizing the group” which indicates that some of those students, who organized the group, had difficulty in using tools. This is interesting in a way and controversial to the expectation that those students who would invite other students to work could be thought to be strong in using tools and suggesting tools to the group. Perhaps since also “Using new tools” had a significant correlation with “Organizing the group”, as presented earlier, the students organizing groups tried new tools for the group and had difficulty with these new tools. They might also have had difficulty with some old tools, and because of that they tried new tools while organizing the group.

The last significant correlation between “Difficulties in using tools” was with “Writing in the first person” (r=0.87). This indicates that some student had difficulty with tools while he/she

was writing in the first person, meaning that he/she was looking things in his/hers personal point of view. Difficulties with tools were mostly occurring at a person level, or at least reported in that way.

4.3.2 Un-clarity and Clarity with the Course

The subcategory "Un-clarity with the course" had statistically significant correlations with five other subcategories. The correlation between "Using new tools" is presented above. A positive correlation (r=0.78) was also between the subcategory "Course is clear" in the same category. This was a bit surprising, but it also underlined that in the same weeks some students were confused about the course and some felt that the course was clear. Based on this it can be argued that the tasks in some weeks of the course were not overall badly constructed since some students had difficulties while others did not. "Un-clarity with the course" had a significant positive correlation (r=0.90) also with "Reflecting new and old knowledge". This may mean that some students reflected on the un-clarity of the course in relation to their new and old knowledge. This knowledge might have had to do with experiences on eLearning.

The "Un-clarity with the course" had significant positive correlation (r=0.72) with "Diagnosing the situation". This indicates that while students diagnosed the situation of their knowledge or the course some of them also reflected to the un-clarity of the course at the same time. "Un-clarity with the course" correlated positively (r=0.83) with "Organizing the group", which indicates that some students started to organize the group while the course was unclear. "Un-clarity with the course" had significant positive correlation (r=0.86) also with "Writing in the first person" indicating that students having problems with the course wrote in the first person, from their personal point of view. Similar kind of correlation was also found between "Difficulties in using tools" and "Writing in the first person", as pointed out earlier. Perhaps different kinds of difficulties are preferred to be presented from a personal point of view.

The subcategory "Course is clear" had statistically significant correlation with six other subcategories. The correlations with "Using new tools", "Difficulties in using tools" and "Un-clarity with the course" were presented earlier. There was significant positive correlation (r=0.87) also with the subcategory "Reflecting new and old knowledge", indicating that while reflecting on their knowledge, the students reflected on how the course got clear in relation to their previous experiences. This correlation was interesting since there was a positive

correlation also between “Un-clarity with the course” and “Reflecting new and old knowledge”. This suggests that some students reflect on the un-clarities and the course clearing up while they reflect on their knowledge.

“Course is clear” and “Diagnosing the situation” had positive correlation (r=0.72) between them. This argues that diagnosing situation included some reflections about the course clearing up. Since there was also positive correlation between “Un-clarity with the course” and “Diagnosing the situation” as presented earlier, it can be argued that students diagnosed about the course too while they diagnosed about their knowledge. “Course is clear” correlated positively (r=0.83) also with “Writing in the first person” which indicates that students reflect on things related to the course in first person, form their personal point of view.

4.3.3 Reflecting the Self and the Self as Part of Group

The subcategory “Reflecting new and old knowledge” had statistically significant correlations with seven subcategories. This subcategory had correlations with “Using new tools”, “Difficulties in using tools”, “Un-clarity with the course” and “Course is clear” as presented earlier. “Reflecting new and old knowledge” had a positive correlation (r=0.83) also with “Diagnosing the situation”, which indicates that these subcategories overlap at some level. Students reflect on their knowledge while they also diagnose what they know and the course.

There was a significant positive correlation (r=0.74) between “Reflecting new and old knowledge” and “Organizing the group”. From this it can be argued that some students reflected their knowledge while they organized the group. Perhaps some students reflected on their knowledge and experiences on other groups they had participated in. “Reflecting new and old knowledge” had a positive correlation (r=0.88) also with “Writing in the first person”. This indicates that while reflecting on their knowledge, students preferred to write from a personal point of view instead of bringing up the group.

The subcategory “Noticing a change in the self in a position in group” had no statistically significant correlations with other subcategories.

4.3.4 Creating Strategy

The subcategory “Diagnosing the situation” had statistically significant correlation with seven other subcategories. “Diagnosing the situation” had positive correlation with “Using new

tools", "Difficulties in using tools", "Un-clarity with the course", "Course is clear" and "Reflecting new and old knowledge", as presented earlier. "Diagnosing the situation" had also a positive correlation (r=0.80) with "Organizing the group", which indicates that some students diagnosed the situation while they also mentioned issues related to organizing the group. This subcategory also indicated that while students diagnosed the situation, they reflected it from their personal point of view since "Diagnosing the situation" and "Writing in the first person" had a positive correlation (r=0.89) between them.

The subcategory "Setting goals" had statistically significant correlation only with one other subcategory. "Setting goals" correlated (r=0.75) with "Writing in the first person" which indicates that the students set their goals from their personal point of view instead of a group point of view. Also the subcategory "Formulating needs" from the same category had only one statistically significant correlation with other categories. There was a positive correlation (r=0.72) between "Formulating needs" and "Identifying resources". From this it can be argued that while the students were formulating needs to get to their goal, they also identified the resources needed in order to be successful.

The subcategory "Identifying resources" had a statistically significant correlation with the above mentioned "Formulating needs" and with "Writing as a part of the group". The positive correlation (r=0.68) with the last mentioned indicates that the resources were identified from a group point of view.

The subcategories "Finding strategies", "Creating an agenda", "Implementing the strategy" and "Evaluating the outcome" did not have any statistically significant correlations between other subcategories. This might mostly indicate serious problems in using self-direction components systematically in self-reflection blog posts. The expectation that students would use all the planning, implementation and evaluation phases for self-directing their goal-directed activities might be premature.

4.3.5 Observed Change

Both subcategories of this category, "Noticing a change in the self" and "Realising a change in the others", had no statistically significant correlations with the other subcategories. This raises a question whether this category is worthy in the whole process of self-direction.

4.3.6 Using the Team as a Tool

The subcategory “Expecting others to work” had no statistically significant correlations with other subcategories. On the other hand, the other subcategory, “Organizing the group” had statistically significant correlations with six other subcategories. The correlations with “Using new tools”, “Difficulties in using tools”, “Un-clarity with the course”, “Reflecting new and old knowledge” and “Diagnosing the situation” have been presented earlier. “Organizing the group” had positive correlation (r=0.83) also with “Writing in the first person”.

4.3.7 The Voice of the Writer

The subcategory “Writing in the first person” had statistically significant correlations with eight other subcategories. The subcategories which had correlations with “Writing in the first person” were “Using new tools”, “Difficulties in using tools”, “Un-clarity with the course”, “Course is clear”, “Reflecting new and old knowledge”, “Diagnosing the situation”, “Setting goals” and “Organizing the group” as presented earlier.

This finding of “Writing in first person” indicates that the students used first person style to reflect while they had difficulty or un-clarities, but also when the situation had cleared up. First person was used also while the student reflected on his/hers knowledge, diagnosed the situation, or was setting goals. It was used when organizing the group, probably because this organizing was strongly coming from the individual point of view. There have also been findings in other studies that indicate that writing in the first person occurred when students faced difficulties (Kieslinger & Pata, 2008). While writing in the first person, using new tools and difficulty with tools had interrelations with many activities; new tools made the student, for example, reflect on his/hers knowledge and also diagnose the situation.

The subcategory “Writing as a part of group” had a statistically significant correlation with three other subcategories. This subcategory correlated with “Using same tools”, “Starting to use again some tools” and “Identifying resources” as presented earlier. Based on this finding it can be argued that the students started to reflect from a group point of view when they used the same tools weekly or started to use some tools that they had used earlier. Group-mode writing occurred also when the students identified resources, indicating that resources were an issue that was identified from a group-point of view, and the group was possibly also marked as a resource.

"Organizing the group" correlated significantly with "Writing in the first person" (r=0.83), while "Expecting the others to work" correlated with "Writing as a part of group" (r=0.53). Additionally, when the students perceived "Un-clarity with the course", they started "Organizing the group" (r=0.83). All this indicates that when the students perceived un-clarities individually, it triggered them to consider using the team as a tool to clear their individual understandings.

4.4 Summary

Finding and validating a set of categories as self-direction indicators from the student's self-directed blog posts started as a process of going through the theory. The categories that are presented in chapter 4.1 explained coherently the situation. Therefore it may be argued that these categories serve as worthy indicators of self-direction.

The examination of how self-direction develops during the eLearning course was done by using Paired Samples T-Tests and by analysing frequency figures made with MS Excel indicating the weekly usage of the categories. The results indicated frequent use of new tools in the first week. In the following weeks the students kept on using the same tools but also stopped to use some tools significantly often. Most of the students who felt confused about the course had this perception during the first study week. In the first week, a small amount of the students reflected their old knowledge: they compared it with the new knowledge, or noticed something new. The occurrence of this indicator dropped tremendously after the first week. Some students reflected on a change in the self in a position in the group during the weeks of intensive group activities.

In the first weeks the students diagnosed the situation more often than in last weeks of the course. The emphasis of the goal setting was in the first third of the course. Formulating the needs happened almost throughout the course as also happened the identification of the resources. Implementing the strategy started from the half-way of the course. Evaluating the outcome was more frequent during the last weeks of the course. At the beginning of the course the students might learn other ways to work than they knew from earlier. Preparing the group work possibly raised questions again about other ways to work as a group. Reflecting on organizing the group was lower during the weeks of individual work. Expecting the others to work had peaks in the weeks when the issue considered personal learning contracts.

Most of the students wrote in the first person at the beginning of the course. This way of writing decreased in time while writing in plural increased. In the last weeks, the use of the first person increased a bit, in relation to use of plural. Perhaps at the end of the course the students started to see the course again from an individual point of view when they started to reflect on their experiences and do the last individual assignments.

To examine interrelations of the self-direction indicators in the eLearning course, Pearson correlation analysis was conducted. The initial eLearning circle presented in chapter 4.1 was revised as a result of this analysis (see figure 10) and some of the initial ideas were proved true because certain correlations appeared. A ruptured situation can be, for example, the new tools making the student feel uncertain, difficulty in using tools, un-clarity with the course, different perspectives occurring in the student's mind, or the student seeing things in the opposite way as the group mates. A ruptured situation can also be one where the student expects the group mates to work; he/she is wondering, for example, why the others in the group are not doing anything. A ruptured situation is a trigger, it causes pressure, and it makes the student start looking for tools to get the situation solved. The tools can be software, group mates as tools, or the student´s own self-reflection as a tool.

Finding the proper tools indicates that the student gets to the second stage of the eLearning cycle. The student starts to work through a strategy; diagnose the situation, identify resources, formulate needs, find strategies, create an agenda, implement the strategy and evaluate the outcome. Some might also start to organize the group. At this point it is possible for the student or the whole group to get to the next level. In stage three, the course is clear and the group is using the same tools as earlier and/or starting to use again some tools; they have noticed that either they already have good tools or that they had some good tools before and want to take them back. The group is working well, getting towards the goal.

At this stage, if the student notices a change in the self or in the group, he/she observes that learning has occurred. This way it is possible to get out of the circle, to the final stage. The outcome is achieved. Another possibility in the third stage is for the group to get again into a ruptured situation. Perhaps all the group mates are not working as the others expect. Then the circle starts to go around all over again. Some groups might never get to the third stage and some even get stuck in the first stage.

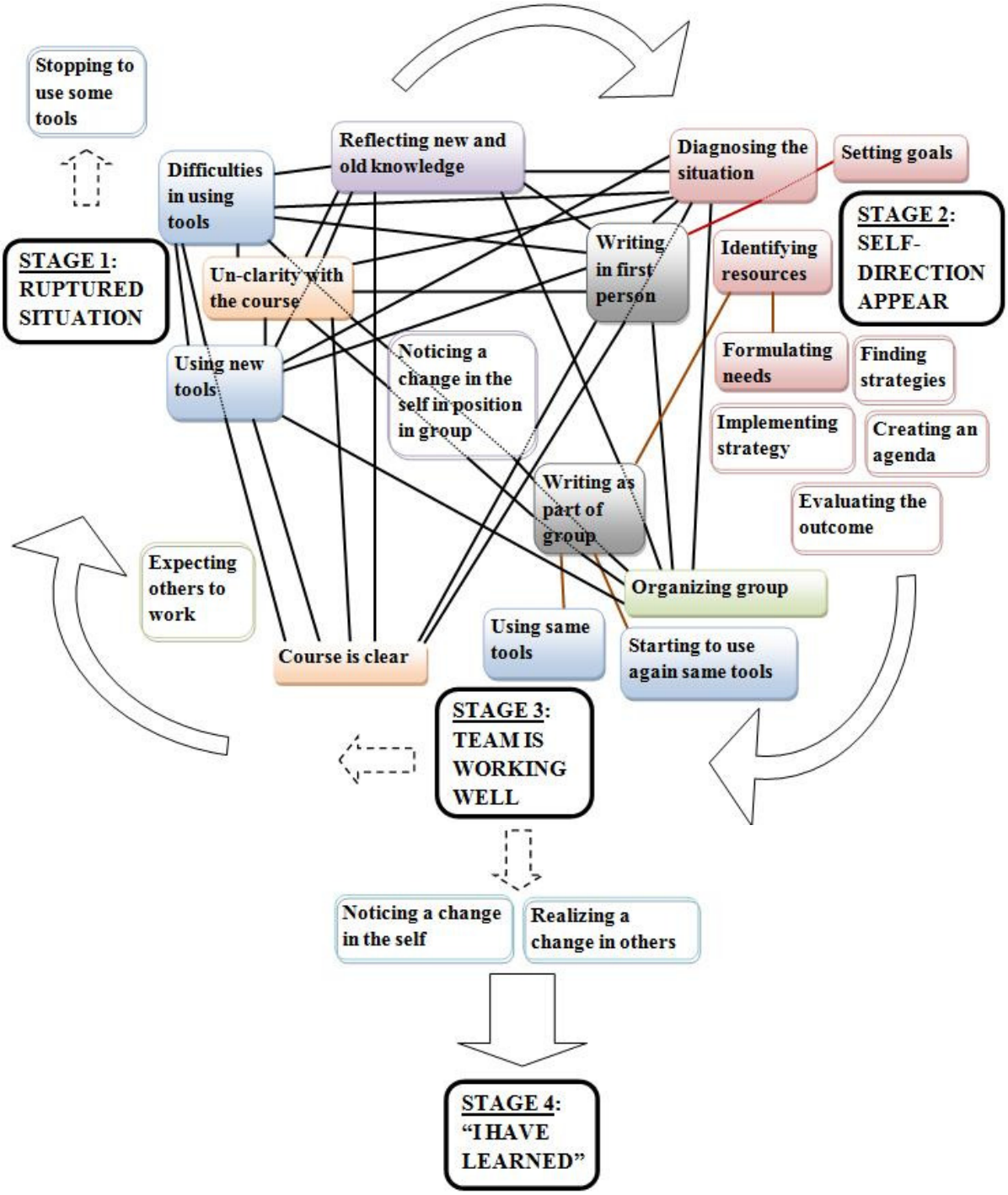

Figure 10. Revised, more detailed circle of eLearning

Figure 10 also shows the interrelations between the subcategories. Subcategories in the blocks with background colour have interrelation with at least one other subcategory. The subcategories in blocks with just frames are not correlated with any other subcategory. The dotted lines mean that the line is going behind the block, not indicating that the precise block is in interrelation. The black lines present the first set of subcategories which had interrelations with each other: "Using new tools", "Difficulties in using tools", "Reflecting

new and old knowledge", "Un-clarity with the course", "Diagnosing the situation" and "Writing in the first person". "Course is clear" and "Organizing the group" have the same colour since they had interrelations with the mentioned set, but not with each other. The other set of interrelations between the subcategories is marked with brown lines and the red line presents the single interrelation between "Writing in the first person" and "Setting goals".

Overall, it can be said that the students went from self-oriented to group-oriented working during the course. The students used different tools (software but also the team as a tool) in order to get to the outcome. The tools were interrelated with multiple subcategories. Some students reflected on different stages of strategy, for example diagnosing the situation and formulating needs throughout the course, though there were only a few interrelations found with other subcategories. The students reflected on their and their group's knowledge and learning, but only the reflection of one's own knowledge had interrelation with other subcategories.

5 Conclusions

In this thesis the goals were to find and validate a set of categories as self-direction indicators in self-reflected blog posts, to examine how self-direction develops during an eLearning course and to examine the indicators of self-direction during the eLearning course to see if and how they are interrelated. As a result of this study a set of self-direction indicators were found that adequately make it possible to detect the self-direction phenomena from the students' self-reflections at the web 2.0 eLearning course. The time-dependent analysis of the course provided some knowledge of how self-direction components develop at web 2.0 eLearning courses. The analysis of the interrelations between self-direction indicators gave some idea of the whole self-direction process as a cycle during the course. The design-based eLearning course was used as an example of how to use these categories and the results are the actual outcome of this study.

The research questions were as follows:

- What are the identifiers of self-direction in students' self-reflections in blog postings?
- How does self-direction develop during the eLearning course?
- How are self-direction indicators interrelated at the eLearning course?

All the categories of the self-direction indicators gave some value to this study, even though the categories “Tool Usage”, “Creating Strategy”, and “The Voice of the Writer” were reflected most often and that way also gave more material than others. Perhaps the best outcome is reached when using all the categories together and taking advance of the interrelations of the categories. However, it is to be remembered that in general, the missing correlation does not necessarily mean that something is not important.

There is also a question that perhaps self-direction was initially reflected through the whole course but during the process it became more internalized. Perhaps the students got so self-directed that they felt that self-reflecting is in vain. This might explain why the later reflections did not contain the same amount of indicators of self-direction as the early reflections, or sometimes the self-reflective writing was even stopped. So if self-reflections stay internal, there is no way self-direction can be detected.

There was rather low response to the category “Reflecting the Self and the Self as Part of Group” and also Paired Samples T-Tests showed no significant differences in it. On the other

hand, in the Pearson correlation analysis the first subcategory, “Reflecting new and old knowledge”, was in correlation with many other subcategories. This leads to a conclusion that reflecting ruptured situations is not the strongest indicator of self-direction but that it gives at least some aspects.

Using the Knowles' (1975) theory about self-directed actions was a bit of a disappointment. Students are not reflecting so much on their strategy processes. This also highlights the fact that when self-direction is searched from the students' self-reflections it is normal that they might not reflect on self-direction issues at all. Finding strategies, creating an agenda, implementing the strategy, evaluating the outcome, noticing a change in the self, realising a change in the others, expecting the others to work and stopping to use some tools did not have any statistically significant correlations with other subcategories. This might indicate serious problems in using self-direction components systematically in self-reflection blog posts. The expectation that students would use all the planning, implementation and evaluation phases for self-directing their goal-directed activities might be wrong.

Recognizing indicators of self-direction with the categories presented in this thesis can help course facilitators to guide the students towards better self-direction. The use of self-reflections, for example in form a of blogs posts, are suggested to be taught to the students so that they can better understand the self-direction processes inside themselves and also see the learning process as a whole. Knowing the interrelations between self-direction indicators would also make it possible to understand and predict students' behaviour in eLearning courses by monitoring their self-reflections.

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7 Annexes

7.1 Annex A: The Paired Samples T-tests

Annex A.1. The Paired Samples T-Test of category 1, Tool Usage

Week		Using New Tools				Using Same Tools				Stopping to Use Some Tools				Starting to Use Again Some Tools				Difficulties in Using Tools			
pairs	Weeks	Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,91	54	9,388	,001	,00	54	-3,464	,001	,00	54	-3,250	,002	,00[a]				,07	54	1,352	,182
	2	,25				,18				,16				,00[a]				,02			
2-3	2	,25	54	,227	,821	,18	54	-,468	,642	,16	54	2,182	,034	,00	54	-1,000	,322	,02	54	,000	1,000
	3	,24				,22				,04				,02				,02			
3-4	3	,24	54	1,070	,289	,22	54	,000	1,000	,04	54	,000	1,000	,02	54	,000	1,000	,02[a]			
	4	,16				,22				,04				,02				,02[a]			
4-5	4	,16	54	-1,993	,051	,22	54	,903	,371	,04	54	-1,137	,261	,02	54	,000	1,000	,02	54	1,000	,322
	5	,29				,16				,09				,02				,00			
5-6	5	,29	54	1,299	,199	,16	54	,000	1,000	,09	54	1,137	,261	,02	54	-,574	,568	,00[a]			
	6	,20				,16				,04				,04				,00[a]			
6-7	6	,20	54	1,695	,096	,16	54	-,629	,532	,04	54	-1,137	,261	,04	54	,574	,568	,00[a]			
	7	,11				,20				,09				,02				,00[a]			
7-8	7	,11	54	-,574	,568	,20	54	1,158	,252	,09	54	1,352	,182	,02	54	-,574	,568	,00[a]			
	8	,15				,13				,04				,04				,00[a]			
8-9	8	,15	54	1,695	,096	,13	54	-1,000	,322	,04	54	,000	1,000	,04	54	,000	1,000	,00[a]			
	9	,05				,18				,04				,04				,00[a]			
9-10	9	,05	54	,444	,659	,18	54	-,299	,766	,04	54	,574	,568	,04	54	,000	1,000	,00[a]			
	10	,04				,20				,02				,04				,00[a]			
10-11	10	,04	54	-,814	,419	,20	54	,375	,709	,02	54	-,574	,568	,04	54	,000	1,000	,00[a]			
	11	,07				,18				,04				,04				,00[a]			
11-12	11	,07	54	,000	1,000	,18	54	,000	1,000	,04	54	,000	1,000	,04	54	1,000	,322	,00[a]			
	12	,07				,18				,04				,02				,00[a]			
12-13	12	,07	54	2,058	,044	,18	54	1,936	,058	,04	54	1,427	,159	,02	54	,000	1,000	,00[a]			
	13	,00[a]				,09				,00				,02				,00[a]			
13-14	13	,00[a]				,09	54	1,000	,322	,00	54	-1,000	,322	,02	54	1,000	,322	,00[a]			
	14	,00[a]				,05				,02				,00				,00[a]			
14-1	14	,00[a]	54	23,238	,001	,05	54	-1,765	,083	,02	54	-1,000	,322	,00[a]				,00	54	2,058	,044

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Annex A.2. The Paired Samples T-Test of category 2, Un-clarity with the Course

		Unclarity with the Course				Course Clears Up			
Week pairs	Weeks	Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,24	54	3,047	,004	,05	54	1,000	,322
	2	,04				,02			
2-3	2	,04	54	-,444	,659	,02	54	,000	1,000
	3	,05				,02			
3-4	3	,05	54	-,814	,419	,02	54	1,000	,322
	4	,09				,00			
4-5	4	,09	54	,444	,659	,00[a]			
	5	,07				,00[a]			
5-6	5	,07	54	,444	,659	,00	54	-1,000	,322
	6	,05				,02			
6-7	6	,05	54	1,000	,322	,02	54	1,000	,322
	7	,02				,00			
7-8	7	,02	54	1,000	,322	,00[a]			
	8	,00				,00[a]			
8-9	8	,00	54	-1,427	,159	,00[a]			
	9	,04				,00[a]			
9-10	9	,04	54	1,427	,159	,00[a]			
	10	,00				,00[a]			
10-11	10	,00[a]				,00	54	-1,000	,322
	11	,00[a]				,02			
11-12	11	,00[a]				,02	54	1,000	,322
	12	,00[a]				,00			
12-13	12	,00[a]				,00[a]			
	13	,00[a]				,00[a]			
13-14	13	,00[a]				,00[a]			
	14	,00[a]				,00[a]			
14-1	14	,00	54	4,088	,001	,00	54	1,765	,083

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Annex A.3. The Paired Samples T-Test of category 3, Reflecting the self and the self in group

		Reflecting New and Old Knowledge				Noticing a Change in the Self in Position in Group			
Week pairs	Weeks	Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,09	54	1,659	,103	,00	54	-1,000	,322
	2	,02				,02			
2-3	2	,02	54	,000	1,000	,02	54	,000	1,000
	3	,02				,02			
3-4	3	,02	54	1,000	,322	,02	54	,000	1,000
	4	,00				,02			
4-5	4	,00	54	-1,000	,322	,02		1,000	,322
	5	,02				,00			
5-6	5	,02	54	1,000	,322	,00[a]			
	6	,00				,00[a]			
6-7	6	,00[a]				,00	54	-1,000	,322
	7	,00[a]				,02			
7-8	7	,00[a]				,02	54	-,574	,568
	8	,00[a]				,04			
8-9	8	,00[a]				,04	54	1,427	,159
	9	,00[a]				,00			
9-10	9	,00[a]				,00	54	-1,427	,159
	10	,00[a]				,04			
10-11	10	,00[a]				,04	54	,000	1,000
	11	,00[a]				,04			
11-12	11	,00[a]				,04	54	1,427	,159
	12	,00[a]				,00			
12-13	12	,00[a]				,00[a]			
	13	,00[a]				,00[a]			
13-14	13	,00[a]				,00[a]			
	14	,00[a]				,00[a]			
14-1	14	,00	54	2,324	,024	,00[a]			

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Annex A.4. The Paired Samples T-Test of category 4, Creating Strategy

(First half)

Week		Diagnosing the Situation				Setting Goals				Formulating Needs				Identifying Resources			
pairs	Weeks	Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,15	54	,574	,568	,04	54	-,574	,568	,05	54	-,704	,485	,02	54	-,574	,568
	2	,11				,05				,09				,04			
2-3	2	,11	54	1,427	,159	,05	54	1,000	,322	,09	54	1,352	,182	,04	54	-,444	,659
	3	,04				,04				,04				,05			
3-4	3	,04	54	1,427	,159	,04	54	,574	,568	,04	54	-1,765	,083	,05	54	-1,000	,322
	4	,00				,02				,09				,07			
4-5	4	,00	54	-2,058	,044	,02	54	,000	1,000	,09	54	1,000	,322	,07	54	,000	1,000
	5	,07				,02				,05				,07			
5-6	5	,07	54	1,000	,322	,02	54	1,000	,322	,05	54	,000	1,000	,07	54	-,375	,709
	6	,04				,00				,05				,09			
6-7	6	,04	54	,000	1,000	,00[a]				,05	54	-1,000	,322	,09	54	-,830	,410
	7	,04				,00[a]				,09				,15			
7-8	7	,04	54	,000	1,000	,00[a]				,09	54	,000	1,000	,15	54	1,352	,182
	8	,04				,00[a]				,09				,09			
8-9	8	,04	54	1,000	,322	,00	54	-1,000	,322	,09	54	2,058	,044	,09	54	1,352	,182
	9	,02				,02				,02				,04			
9-10	9	,02	54	-1,000	,322	,02	54	1,000	,322	,02	54	-1,427	,159	,05	54	-,444	,659
	10	,04				,00				,05				,07			
10-11	10	,04	54	1,427	,159	,00	54	-1,000	,322	,05	54	1,427	,159	,07	54	1,765	,083
	11	,00				,02				,02				,02			
11-12	11	,00[a]				,02	54	1,000	,322	,02	54	,000	1,000	,02	54	1,000	,322
	12	,00[a]				,00				,02				,00			
12-13	12	,00[a]				,00[a]				,02	54	1,000	,322	,00[a]			
	13	,00[a]				,00[a]				,00				,00[a]			
13-14	13	,00[a]				,00[a]				,00[a]				,00[a]			
	14	,00[a]				,00[a]				,00[a]				,00[a]			
14-1	14	,00	54	3,032	,004	,00	54	1,427	,159	,00	54	1,765	,083	,00	54	1,000	,322

a. The correlation and t cannot be computed because the standard error of the difference is 0.

(Second half)

Finding Strategies				Creating an Agenda				Implementing Strategy				Evaluating the Outcome			
Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.	Mean	df	t	Sig.
,00	54	-1,427	,159	,00	54	-1,000	,322	,00[a]				,00[a]			
,04				,02				,00[a]				,00[a]			
,04	54	1,427	,159	,02	54	1,000	,322	,00[a]				,00[a]			
,00				,00				,00[a]				,00[a]			
,00	54	-1,427	,159	,00	54	-1,000	,322	,00[a]				,00[a]			
,04				,02				,00[a]				,00[a]			
,04	54	,000	1,000	,02	54	,000	1,000	,00[a]				,00[a]			
,04				,02				,00[a]				,00[a]			
,04	54	,574	,568	,02	54	1,000	,322	,00[a]				,00[a]			
,02				,00				,00[a]				,00[a]			
,02[a]				,00[a]				,00	54	-1,000	,322	,00[a]			
,02[a]				,00[a]				,02				,00[a]			
,02[a]				,00	54	-1,000	,322	,02	54	1,000	,322	,00[a]			
,02[a]				,02				,00				,00[a]			
,02	54	,000	1,000	,02	54	1,000	,322	,00	54	-1,000	,322	,00	54	-1,000	,322
,02				,00				,02				,02			
,02	54	-,574	,568	,00[a]				,02	54	-1,352	,182	,02[a]	54		
,04				,00[a]				,07				,02[a]			
,04	54	1,000	,322	,00[a]				,07	54	-,444	,659	,02	54	-1,000	,322
,02				,00[a]				,09				,04			
,02	54	1,000	,322	,00[a]				,09	54	1,352	,182	,04	54	-1,936	,058
,00				,00[a]				,04				,13			
,00[a]				,00[a]				,04	54	1,427	,159	,13	54	1,936	,058
,00[a]				,00[a]				,00				,04			
,00[a]				,00[a]				,00[a]				,04	54	,000	1,000
,00[a]				,00[a]				,00[a]				,04			
,00[a]				,00[a]				,00[a]				,04	54	-1,427	,159

Annex A.5. The Paired Samples T-Test of category 5, Observed Change

		Noticing a Change in the Self				Realising a Change in the Others			
Week pairs		Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,07	54	1,352	,182	,00[a]			
	2	,02				,00[a]			
2-3	2	,02	54	-,574	,568	,00	54	-1,427	,159
	3	,04				,04			
3-4	3	,04	54	-,814	,419	,04	54	1,427	,159
	4	,07				,00			
4-5	4	,07	54	1,352	,182	,00[a]			
	5	,02				,00[a]			
5-6	5	,02	54	-,574	,568	,00	54	-1,427	,159
	6	,04				,04			
6-7	6	,04	54	,574	,568	,04	54	-,444	,659
	7	,02				,05			
7-8	7	,02	54	-1,000	,322	,05	54	,000	1,000
	8	,05				,05			
8-9	8	,05	54	-,574	,568	,05	54	,000	1,000
	9	,07				,05			
9-10	9	,07	54	,444	,659	,05	54	1,427	,159
	10	,05				,02			
10-11	10	,05	54	,000	1,000	,02	54	-1,427	,159
	11	,05				,05			
11-12	11	,05	54	,574	,568	,05	54	,000	1,000
	12	,04				,05			
12-13	12	,04	54	,574	,568	,05	54	1,765	,083
	13	,02				,00			
13-14	13	,02	54	,000	1,000	,00[a]			
	14	,02				,00[a]			
14-1	14	,02	54	1,352	,182	,00[a]			

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Annex A.6. The Paired Samples T-Test of category 6, Using the Team as a Tool

		Expecting Others to Work				Organizing the Group			
Week pairs		Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,00	54	-1,000	,322	,09	54	1,000	,322
	2	,02				,05			
2-3	2	,02	54	-,574	,568	,05	54	1,000	,322
	3	,04				,02			
3-4	3	,04	54	,574	,568	,02	54	-1,427	,159
	4	,02				,05			
4-5	4	,02	54	-1,000	,322	,05		,000	1,000
	5	,05				,05			
5-6	5	,05	54	1,000	,322	,05		1,000	,322
	6	,02				,02			
6-7	6	,02	54	-,574	,568	,02	54	,000	1,000
	7	,04				,02			
7-8	7	,04	54	,574	,568	,02	54	-1,000	,322
	8	,02				,04			
8-9	8	,02	54	-1,765	,083	,04	54	,000	1,000
	9	,07				,04			
9-10	9	,07	54	2,058	,044	,04	54	1,000	,322
	10	,00				,02			
10-11	10	,00	54	-1,000	,322	,02	54	1,000	,322
	11	,02				,00			
11-12	11	,02	54	-,574	,568	,00[a]			
	12	,04				,00[a]			
12-13	12	,04	54	1,427	,159	,00[a]			
	13	,00				,00[a]			
13-14	13	,00[a]				,00[a]			
	14	,00[a]				,00[a]			
14-1	14	,00[a]				,00	54	2,324	,024

a. The correlation and t cannot be computed because the standard error of the difference is 0.

Annex A.7. The Paired Samples T-Test of category 7, The Voice of the Writer

		Writing in the First Person				Writing as a Part of the Group			
Week pairs		Mean	df	t	Sig.	Mean	df	t	Sig.
1-2	1	,91	54	4,245	,001	,04	54	-,444	,659
	2	,60				,05			
2-3	2	,60	54	2,631	,011	,05	54	-1,272	,209
	3	,42				,13			
3-4	3	,42	54	1,218	,229	,13	54	,000	1,000
	4	,33				,13			
4-5	4	,33	54	-1,299	,199	,13	54	-1,000	,322
	5	,42				,16			
5-6	5	,42	54	1,299	,199	,16	54	1,000	,322
	6	,33				,11			
6-7	6	,33	54	2,194	,033	,11	54	-1,695	,096
	7	,22				,20			
7-8	7	,22	54	,000	1,000	,20	54	1,137	,261
	8	,22				,15			
8-9	8	,22	54	1,000	,322	,15	54	-,331	,742
	9	,16				,16			
9-10	9	,16	54	1,427	,159	,16	54	-,574	,568
	10	,13				,18			
10-11	10	,13	54	-1,352	,182	,18	54	,574	,568
	11	,18				,16			
11-12	11	,18	54	-,704	,485	,16	54	1,352	,182
	12	,22				,11			
12-13	12	,22	54	3,464	,001	,11	54	1,000	,322
	13	,04				,07			
13-14	13	,04	54	-1,427	,159	,07	54	1,765	,083
	14	,07				,02			
14-1	14	,07	54	16,613	,001	,02	54	,574	,568

a. The correlation and t cannot be computed because the standard error of the difference is 0.